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OCTOBER 1925

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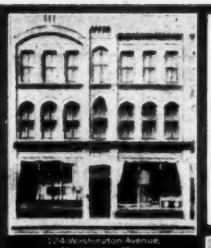
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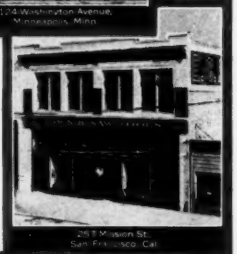
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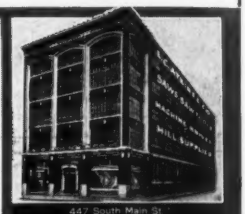
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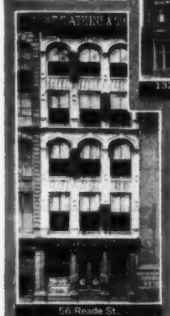
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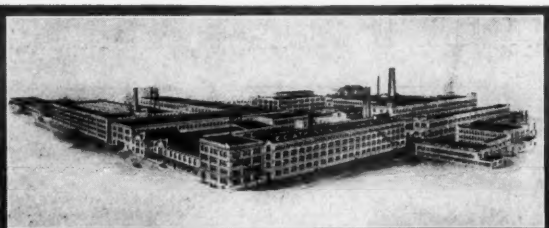
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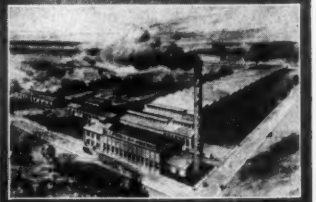
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NEWS APPRECIATED

THE news columns of the INDUSTRIAL ARTS MAGAZINE are intended to serve our readers, to the utmost of our news-gathering ability, as sources of information on the hapenings in the field. We believe that the news department is as important in its own way as the leading articles, the editorial pages proper, the shop projects department, and the other sections of the magazine. It reflects the progress, the growth, and even the failures of the field and of the men and women who are carrying on the work.

While there is always an immense amount of news matter clamoring for publication each month, the Editors are constantly seeking items of information concerning the work of vocational education, vocational guidance, and industrial arts, and of the men and women who are teaching it.

The Editors of the Magazine appreciate at all times all news and comments which readers send in for publication. In this connection, they extend a hearty invitation to every reader to contribute to the News Department, any facts concerning their work, especially new undertakings, extensions of courses, new methods, new types of projects,—in a word anything which may be of interest and value.

After all a Magazine is a sort of monthly clearing house and in the measure that its readers contribute to it in the same measure will they all benefit.

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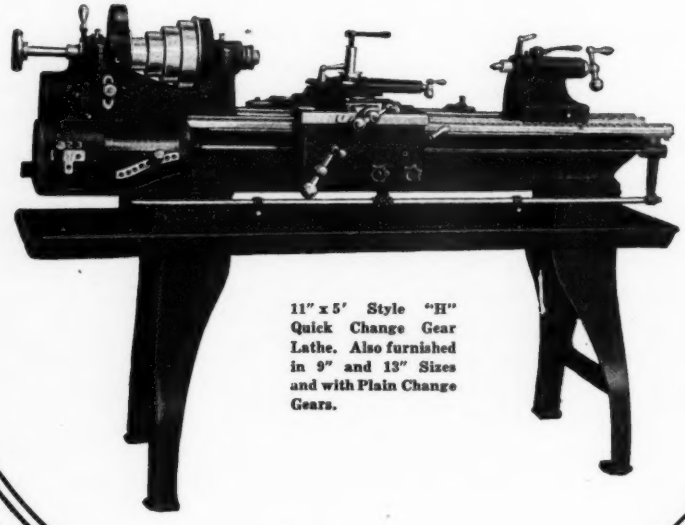

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THE INDUSTRIAL ARTS MAGAZINE

Volume XIV OCTOBER, 1925 No. 10

Do School Executives Realize the Vocational Teacher's Difficulty?

B. H. Van Oot, State Department of Education, Richmond, Va.

THE purpose of this article is to discuss with school superintendents, principals, school board members and teachers of academic subjects the problems which the vocational teacher is compelled to face. I want to show, if possible, that the teacher of vocational subjects must be a superior individual, endowed with qualities of leadership, personality, scholastic ability, managerial ability and experiences which, though desirable, are not necessarily required by the teacher of academic subjects.

The selection of this topic for discussion is prompted by the attitude which is frequently displayed by school executives and teachers with whom the writer has come in contact in various parts of the country. The vocational teacher, were one to exist, is frequently regarded as a necessary, though subordinate adjunct to a school faculty and usually, being a man trained in industry, he is considered uncouth, uneducated and incapable of associating equally with those who are more scholastically trained. In fact, on one occasion when the writer endeavored to interest the faculty of an engineering school in trade education, one member of the faculty rose to his feet and with the oratory and gestures of a modern Demosthenes exclaimed: "If this faculty approves of such trade courses as this gentleman describes and we have to associate with teachers and students on the level with those usually found in such classes, it would be comparable to a college professor marrying a washer-woman." Incidentally the fact might be mentioned that this college "professor" received his early education in a machine shop course similar to the kind to which he was objecting.

There is no need to go into the reasons for such an attitude because it is the natural result of an educational evolution. History teaches us that the attitude which is now frequently displayed by some school people (and fortunately is confined largely to school people) is the same as was displayed by our forefathers when the old order of things was disturbed by the then new, but now highly respected, subjects as the natural and physical sciences, dentistry, engineering, surgery, and a host of other subjects. The promoters of the new are continually being criticized by the followers of the old, and their programs are looked upon with skepticism and fear.

The people interested in promoting vocational education programs are not unappreciative of this situation and are endeavoring to show that vocational education has before it the same promises for future development as had engineering, (formerly a transit carrier), dentistry, and surgery (formerly the side lines of barbers), when they were first introduced into the schools and colleges.

Another cause for the unfavorable attitude held by some may be mentioned in passing. Vocational education has been rather unfortunate in its history. In time it has been associated with slavery, serfdom, and unfortunate labor disputes. It had its later developments in reformatories, houses of correction, and penal institutions. Further, when it was first introduced into the school system it drew into its ranks students who were mentally deficient, socially abnormal, and educationally retarded. Not until recently has the fact been recognized that the teachers of such individuals should be persons especially trained and naturally endowed with special characteristics in order to "put across" successfully an educational program adapted to the needs of such individuals.

Right here it is necessary to define the field of vocational education in order that the reader may not get it confused with certain types of corrective or manual instruction which frequently are labeled vocational classes. Instruction which makes use of manipulative processes and incidentally uses tools and materials for illustrative purposes, or to create additional interest in the acquisition of academic subjects is not vocational education, though frequently interpreted to be such. Vocational education consists in a well organized, specific form of education, leading toward a definite objective. The course may cover a few days' instruction or may cover several years, according to the length of the gap between the individual and the objective. It is intended for normal individuals. Frequently, however, abnormal types are enrolled in vocational courses. This cannot be avoided in vocational courses any more

than misfits can be prevented from entering, on the college level, vocational courses for the ministry, law or medicine.

With this idea of what constitutes a vocational class, let us consider some of the perplexing problems which the vocational teacher encounters that the teacher of academic subjects rarely meets.

Pupils of Varying Abilities Mixed in Same Group

Because pupils are drawn from all walks of life, and represent in a large measure, differences of ability and skill in the vocation which they have entered, there are usually several levels of ability and scholarship represented in the personnel of the class. This does not necessarily say that any of the individuals are mentally deficient. It simply means that the class is composed of individuals differing in scholastic attainment, which of course, adds greatly to the problem of imparting instruction.

Individual Instruction Must Be Given

Under these conditions the class organization for instructional purposes is difficult. Either the class must be divided into ability groups and the instruction imparted on levels commensurate with the group level, or else the instruction must be individual. In either case the amount of preparation the teacher is compelled to make is multiplied by the number of levels upon which the instruction must be given. In rare instances, if any, does the teacher of academic subjects have to prepare his lessons on such a basis. In so preparing his lessons the vocational teacher must, of necessity, study individual needs and individual progress in order that complications shall be avoided and the morale of his class be maintained.

Teaching Complicated by Elaborate Equipment

In preparing a lesson, and later in putting the instruction "across", the vocational teacher's work is considerably complicated by more or less elaborate equipment. It is not possible to have a machine of a given kind for every individual in the class. This necessitates the adaptation of the instruction to the equipment available, frequently requiring considerable foresight in order to keep all students *progressively* busy. Further than this, the instruction must be arranged so that students will be assigned to processes or machines commensurate with their ability to profit by the same. In doing this the vocational teacher has to weigh the student's ability in terms of spoilage of material, breakage of machine parts, liability to accidents, and a dozen other things. But few of these elements need be considered by the academic teacher in preparing for instruction.

Lack of Cooperation from Associate Teachers

The introduction of vocational teaching into the public schools is comparatively recent. For this reason the teachers of the academic branches, being in a large measure, uninformed relative to the objectives of vocational work, frequently are unsympathetic with the program and consequently look upon it as an inferior type of work. This attitude frequently is a decided handicap to the vocational teacher, especially in the matter of discipline. If the associate teachers entertain the idea that students in the vocational classes are inferior to those in the academic classes, this attitude naturally is acquired by the students, who in turn look upon the students in vocational classes as inferior. In fact, the writer recently conferred with a school superintendent who stated that he wished he had sufficient money to establish a "vocational class" because there were many boys in his school system who are retarded and needed such instruction as that offered in a vocational class. It is exceedingly difficult for the teacher of vocational subjects to get the cooperation of his associates when such an attitude is entertained, except, perhaps, when a table, a bookcase, or some apparatus is needed.

Vocational Teachers Frequently Have to Deal with Students of Low Mentality

Notwithstanding the objectives of vocational education as defined previously, students of low mentality are registered in vocational classes. Teachers are not permitted to select their students. The vocational teacher takes the students assigned to him and does the best he can with them. When a number of retarded or subnormal students are assigned to a given teacher, that teacher must be of the highest type, professionally and socially, if any degree of success is to be attained. This is a point which some superintendents overlook when engaging the services of a special teacher, and in estimating the work of that teacher after he is on the job. Under these conditions "any good mechanic" will not do as a teacher, though some good mechanics who possess natural qualities of leadership may do.

Vocational Teaching Embodies Mental, Social and Motor Adjustments

The academic teacher adapts his teaching methods primarily to mental adjustments, i. e., the acquisition and interpretation of information. Motor and social adjustments are only a secondary consideration in the classroom (except in the lower grades in teaching reading and writing) though, of course, they are of importance. Their application is found outside of the class recitation. If emphasized at all, the emphasis comes through the formation of ideals and habits which are supposed to carry over into life. The vocational teacher, on the other hand, not only has to direct mental adjustments in the classroom or shop, but has the added burden of responsibility for the acquisition of motor and social adjustments as manifested in the acquisition of skill and the direction of group activities.

Teacher Must Keep Currently Informed Relative to Vocational Processes and Vocational Advancement

Added to the many responsibilities of the vocational teacher is the importance of keeping currently informed relative to the progress of the vocation which he is teaching. This not only includes preparation but also vocational technique. This is an age of science and scientific application. The methods employed in doing things today may be obsolete tomorrow. It is quite evident, then, that the teacher of vocational work must keep abreast with the times and not incorporate into his teaching those things which are obsolete. The same

is true of many forms of academic teaching, notably in the sciences and in interpretative history. The subject matter of other subjects except perhaps on a college level, is more or less static—it remains constant and when once acquired remains more or less permanent. In other words, when a teacher of academic subjects, mathematics, for instance, once learns his subject matter there is little else to acquire, except perhaps professional information and new applications which will enable him to teach his subjects better. In vocational teaching the teacher is constantly confronted with the problem of keeping up to date.

Vocational Teacher Must Cooperate with and Meet Objections from Outside Organizations

Society in general has accepted without reservations, the traditional course of study as now offered in the schools. Not so with the special forms of education. When one discusses educational problems with the average individual, that individual invariably thinks in terms of the educational system through which he passed as a student. Because the special branches of instruction are new, the vocational teacher is constantly confronted with the problem of defending the efficacy of his work. In addition, he is required to coordinate his work with the demands made by manufacturers, labor organizations, social organizations, building codes and underwriters' provisions. This is no easy proposition. Further, he is called upon to defend his work before those who are positively opposed to it, due to ignorance on their part of the importance of the work. Whoever heard of a teacher of history, of mathematics, of science, or of literature having to defend these subjects?

The Vocational Teacher Must Create Public Interest

In former years the public in general thought that the responsibility of the public schools was to educate those who were fortunate enough, through favorable inheritance, social and physical, to attend school. The object of instruction in those days was to prepare children to progress from grade to grade through college. Those who were not inclined to follow the traditional courses of study dropped out of the schools to follow whatever they would. It is now generally conceded that the responsibilities of the school is to carry education to all the people, regardless of race, color, or future occupation. At least all of the states have accepted this thesis in accepting the terms of the Federal Vocational Act. The fact, however, that the states have officially accepted this thesis does not carry with it the idea that the individuals who compose the state are "sold" to the proposition. It, therefore, remains an important responsibility of the vocational teacher to create public interest in the work which the state has officially accepted as a part of its educational program. The vocational teachers of the several states have gladly accepted this responsibility, to the end that a rather heavy burden is added to their teaching job through discussing their work with individuals and before social and civic organizations. This, also, is no easy task. It is not an easy matter to change the public's attitude toward something which they have cherished for many years. The rapid growth of the vocational program within the several states is sufficient evidence of the fact that vocational teachers have not been idle.

Vocational Teachers Must Demonstrate Technical Values of Given Practical Problems

The vocational teacher, especially the evening school teacher, is required to prove the practicability of every problem presented to his class. The personnel of an evening class consists of men or women who are employed during the day time at work which has to prove its practical value by being marketable. The students are alert to everything that goes on in the shop or classroom. For this reason they readily reject any non-essential, non-practical material which may be presented. The students attend evening classes because they want some definite, well defined instruction, and unless the vocational teacher is prepared to give them the instruction they desire, they cease to attend the class. Of course this is true of evening classes in academic instruction, though here the teacher usually deals with mass instruction while the vocational teacher deals with individual problems arising out of work in a number of different industries. It takes a teacher of exceptional ability, patience and personality to not only make his teaching practical, but to keep his students satisfied and interested in the instruction they are receiving. Each student must feel that after each night's instruction he has gained something that will make him more proficient in his daily work.

The Vocational Teacher Must Make Elaborate Preparation of Supplies

The preparation of supplies for the teaching of an academic subject is insignificant compared to that of teaching a vocational class. Supplies for most vocational classes are numerous and expensive. For this reason the teacher is required to make a detailed analysis of each instruction job, and to determine beforehand what materials and supplies are needed for each job. The instruction is usually on an individual basis, so the number of jobs to prepare for is multiplied by the number of students taking the course. In addition to this preparation, the vocational teacher is required to keep an accurate inventory of his surplus, make out bills of materials to students, figure costs and collect money for materials purchased by the students. The writer has frequently attended academic classes where the instructor has found it necessary to hold up the time of the class until he hunted up a piece of crayon.

The Vocational Teacher Has to Dispose of the Product of the Class

When an academic teacher teaches a class there is no tangible product produced, except an enlightened student, which perhaps is the best product produceable. The vocational teacher not only produces an enlightened student, but in the process of producing this student is required to work upon tangible and frequently marketable products. One of the responsibilities of the vocational teacher, therefore, is to produce a marketable product and after it is produced to see that it is marketed. This consumes a large part of the teacher's

time outside of "working hours". Further than this the vocational teacher is frequently called upon to get class projects from the public—automobiles for the auto-mechanics class, motors, and wiring jobs for the electrical class, etc. To acquire these jobs the instructor must first inspire confidence in himself in the eyes of the patron, for no person is going to allow his car to be worked upon, or his house to be wired, or his motor to be re-wound by a class of students in whom he has not the greatest faith in their ability to do a good job. A college degree, or a normal school diploma, will not produce this faith. Ability to do a good job, and frequent demonstrations of that ability, will alone bring about sufficient faith to get the patron to lend his support.

Collateral Reading and Textbooks Are Difficult to Obtain

Although many attempts have been made to produce textbooks suitable for vocational classes, yet few so far have been produced. (The writer hopes that none will ever be produced, if the use of the same is to be similar to that found in the average high school.) The vocational teacher is required to arrange his instruction on individual instruction sheets, and on each sheet he gives specific references to collateral reading. The process of making out these individual instruction sheets is one of research, constant reading, and an ability to select only that which is pertinent to the problem assigned. To do this efficiently, requires an ability beyond that which the ordinary teacher possesses. It requires superior ability. This collateral material is found in textbooks, trade journals, current magazines, advertising circulars, catalogs, and reports of industries, societies, and governmental and private agencies. To keep currently informed relative to this material requires an application to duty possessed only by the superior individual.

Scholastic Credit Is Not Always Allowed for Vocational Work

The fact that scholastic credit is not always allowed for work done in vocational classes is a matter of little moment. Nevertheless, it is a means of discouraging students in entering the class. We, as a nation, have become accustomed to thinking in terms of "credits" for school work. The vocational teacher, therefore, has the added responsibility of showing his students that the value of the work lies in the amount of personal advancement which the student makes and not in a "credit slip", recognized by higher institutions. This is a responsibility which can be executed only through tact, personality, and respect. No amount of preaching or moral suasion will accomplish this.

School Executives Frequently Lack Understanding Relative to the Vocational Teacher's Problems

In the past, the average school executive has been so busily engaged in the administration of the school system as a whole that he has had little time, and perhaps less inclination, to study the problem of the vocational teacher. Fortunately, this condition of affairs is rapidly changing. He has come to realize the importance of the vocational program and to recognize the demands placed upon the school system by industry and commerce, to the end that he has turned his attention to the details of the administration of a problem which, but a few years ago he considered a "fad" or a "whim," and which was introduced into his school system through, perhaps, no desire on his part. This change is coming about slowly in most communities. In the meantime the vocational teacher is laboring under the strain that the school executives are not fully in sympathy with his program. This attitude may be only imaginary on the part of the writer, but evidence pointing in that direction is frequently brought forth during his conferences with executives and teachers throughout the country.

Naturally school executives want to go slowly in the matter of vocational courses. The vocational program, however, has now reached a stage in development, and is so thoroughly ingrained in the school system that school executives should turn their attention to the problems which the vocational teacher has to face. It is hoped that this article will point out some of the outstanding problems faced by the vocational teacher, and that school executives will give sympathetic ear to these problems when he considers the work of the teacher of shop subjects.

It is not the purpose of this article to criticize or belittle in any way the excellent work accomplished by our associates in the academic field, but rather to elevate the work of the vocational teacher by pointing out some of the important problems the vocational teacher has to solve. The teacher of academic subjects has his many problems to solve, some being the same as those listed above, some different. It is hoped that through pooling the interests of the academic teacher with those of the vocational teacher, the problems of both may be made easier and the work of both more interesting.

HIGH BOY MADE BY STUDENT OF MR. HERMAN J. HJORTH, INSTRUCTOR, RAMON DE BALDIOTORY SCHOOL, SAN JUAN, PORTO RICO.

Development of a General Shop Program for the Joliet Township High School[1]

L. A. Emerson, Vocational Director

IN order to get a clear conception of the situation in the Joliet Township High School some preliminary statements concerning the organization of the school may be in order. The high school district comprises the township of Joliet, organized under the school code of Illinois as a township high school district. The high school is under control of a board of education, entirely separate from the boards of education which control the elementary schools of the township. Each board makes its own tax levies. As the elementary schools of Joliet are administered by a separate board from that controlling the high school, certain difficulties arise in the way of correlating the industrial arts work of the grades with that of the high school.

Another element entering into the situation comes about because of the large number of pupils in Joliet attending parochial schools. In these schools comparatively little work of an industrial arts character is given. Thus some pupils enter the high school with a background of industrial arts; others, with none.

Prior to September, 1922, the Joliet Township High School maintained a manual training curriculum which paralleled the other elective curriculums of the school. One double period of shop work was provided daily during the four years, supplemented by an additional unit of drawing for one year. The curriculum provided for general bench wood-working the first year, wood-turning the second year, pattern-making the third year, and a choice of pattern-making or cabinet-making the fourth year. In addition to the manual training curriculum as a unit, individual shop courses in wood-working were offered as electives in certain other curriculums.

In September, 1922, a program of vocational education, rather comprehensive in character, was introduced into the high school. The wood-working department which formerly provided all the manual arts work of the school, was transformed into a vocational wood-working shop, providing courses in pattern-making, cabinet-making and carpentry. In addition, five other shops were provided, printing, machine shop, plumbing, electrical work, and auto repair. In addition to these, a course in drafting was provided for boys who desired to follow that line of work.

The vocational program provided two and four-year courses in all of these trades. The students in the two-year course spend four and one-half hours per day in the shop and two hours in related and academic instruction. The four-year students spend three hours per day in the shop, the rest of the day in related and academic work. Both courses are strictly vocational and the boy spends all his shop time in one particular trade. Thus, the boy who chooses printing gets four years of shop work in the print shop. He gets no contact with any other shop in the building as an organized part of his work.

In order to provide desirable instruction for the students not already enrolled in vocational classes, it became desirable to set up courses which would give these boys some things which the manual training program has been designed to do but which to some extent failed to materialize. Certain objectives were set forth as the aim of these shop courses which included educational guidance and the obtaining of understanding and appreciation of the industrial life of the community. It was decided that all freshman boys should be required to take these courses. In planning the objectives, it became evident that these boys needed some contact with a variety of industrial work, rather than an intensified course in some one shop such as wood-working. Through a round of experiences in several shops, it was thought they would gain some understanding and appreciation of those industries in so far as a school could reproduce them, and that they would get certain experiences which would help them in more wisely choosing their life work.

In setting up a program of this sort certain controlling administrative factors had to be taken into account. The enrollment of the school as a whole numbered approximately 1,600. The routine of a student assigned to classes, the schedule of the shop periods, and the amount of time available for this type of work, were largely fixed by other elements in the school program. Eighty-one minutes per day, five days per week, was the time allowed. The general administrative plan of the school made it necessary to schedule this shop work at four definite periods of the day, and the assignment of pupils to those periods was made on the basis of needs elsewhere, rather than facilities in the shops. The assignment usually resulted in an unequal distribution of boys over these periods. Six shops were made available for the work, with a drafting department as a seventh possibility.

The number of students to be provided for in the general shops course was about 150 the first year, and this has remained practically constant. The boys are nearly all from the freshman class, part of them coming from the September enrollment and part from the February group.

The original plan for handling this general shop work provided for an equal distribution of students during the four periods of the day and the handling of all students by one instructor, in one shop for the first six weeks, in another for the second six weeks, etc.

[1]Adapted from a paper presented at the Bureau of Education Industrial Conference, Chicago, Feb. 13, 1924.

When the groups were being given the work in any one shop, this general shop instructor was to get some assistance from the other instructors of the shop. It was seen very early that this was an impractical plan under the conditions which were actually found when the vocational program was started. The demand for space and equipment was high in the shop occupied by the general shop students while they were there, and at other periods of the year this equipment was idle. A second difficulty in this plan was the problem of securing an instructor who could satisfactorily handle the work of all these shops.

Almost immediately after the work was started, a change was made in the plans. All the general shop boys were distributed as equally as possible among all the shops, and to a certain extent mixed in with the vocational boys. This developed a number of serious drawbacks. In the first place, the general shop boys did not get the attention that they deserved because the primary interest of the instructor naturally was with the vocational boys. In the second place, no subsidy for the salary of this instructor was available from state or federal funds on account of the mixture of vocational and non-vocational boys. In the third place, the classes assigned to individual shops were so small that they became absorbed in the other groups in the shop, and the unity of objective for this group was lost. It was difficult for the instructor to keep in mind the vocational objective for the one group and an educational guidance and community industrial contact objective for the other. The result was that the general shop boys suffered.

Out of this plan came the present scheme which seems to combine most of the advantages of the other plans and eliminates certain drawbacks. At present, the general shop boys are given during their freshman year a six weeks' period in each of six shops, plumbing, printing, auto repair, machine shop, electrical work and wood-working. During the first semester only three shops handle general shop boys. For example, during the first semester of the year 1924-25 these boys were handled in wood-working, machine shop and printing. During the second semester, the above shops were relieved of their general shop load and the boys were taken care of in the plumbing, electrical and auto departments. Some of the disadvantages of this program are that the shop is burdened with a group of general shop boys during one semester and does not have them the following semester. This requires certain equipment for their use half of the year with this equipment not in use the other half. This is not as serious as it may seem at the outset, because the school is organized on the semester basis and the whole shop program is readjusted at the beginning of each semester. For example, the work in the electric shop night school is heavy during the fall semester, while the print shop is given a heavy extra load in the spring in getting out the school annual. Thus we arrange the program so that the print shop handles its general shop load during the fall and the electric shop takes them during the spring semester.

Under this program three instructors for general shop are needed, and in order to balance the instructor staff it seemed desirable to procure instructors who could handle the work in two shops, in one shop during the fall semester and another shop during the spring. While it is impracticable to expect to find a man who can handle work in six shops, it is working out satisfactorily to have one man handle two shops.

Among the marked advantages of this plan may be mentioned the unity of instruction, that is, the giving of the instructor's full time to one kind of instruction. He does not divide his time among several shops or among mixed groups of vocational and non-vocational students. He is able to keep clearly in mind the objectives of the general shop course and to make a definite study of the boys in his group. Real educational guidance is an impossibility unless it includes a great deal of individual study of the pupil. The present plan makes it possible to do this with the general shop boys.

An additional advantage comes through the esprit de corps of the men handling the general shop. There are three of them under this program. They have common interests, hence they get together to talk over their work and to work out methods of attack for their common problems.

In following out the objective set up for this program, it was felt that in each shop the boy should be given as definitely as possible an intimate contact with the work of that trade. Theory and practice in this connection do not coincide exactly, because while it may be desirable that the boy be given a feel of the advanced processes of the trade, it may not be possible from the shop standpoint to give this until he has passed through a period of preliminary instruction. In the print shop it would be a fine thing for the boy to get some experience in feeding the Miehle press under production conditions. So far this has been impractical because of the large amount of time wasted when errors are made by the boy. Suppose he is feeding the Miehle on a production job and a sheet is not fed squarely against the guides. A possible result is that it will wrap itself around the rollers, requiring a considerable amount of time in cleaning rollers before the press can be started up again. If productive work in the shops were not a necessary factor, possibly such instruction could be provided, but at present it seems unduly expensive.

Advantage is taken of various opportunities to get to the boys information about the trade or industry, which cannot well be given in the shop or classroom by ordinary methods. Motion picture films are used regularly in the electric shop and sometimes in other shops of the school. At the close of the six weeks' period,

each group is taken on a shop trip to a plant which is typical of the work just finished in the shop. In general the aim of acquainting the boy with the industry is followed quite closely.

At the end of each shop course each boy is interviewed by the instructor, and information of value to the personnel department is obtained. Some questions on the data sheet used for this purpose are as follows: Does he like this shop? What portions of this work does he like? Why? What parts does he dislike? Why? Would he like to follow this as a life occupation? Why? Would he probably make good at this occupation? Why? Has he any relatives in this occupation? In addition there is provided a space for any general remarks which the instructor may care to record.

Recently a study was made of some of these data sheets and they brought to light some interesting things. Out of 321 sheets studied, three hundred expressed a liking for the shop. Only 21 definitely stated that they did not like the shop work and some of these statements were very frankly given. One boy expressed his liking for the shop as "rotten", because the work was too hard.

In studying these data sheets, it must be remembered that they come from boys who have already chosen a course of study along some other line than shop work. Many of them are in the pre-engineering curriculum, many in the business administration curriculum, with a scattering of others in other curriculums of the school. In answer to the question concerning their desire to follow this particular trade as their occupation, many of them expressed such a desire as their second choice. A check-up on the instructor's opinion as to whether these boys would make good in the trade, brought to light that quite a large proportion of these boys in the opinion of the instructor would make good. Of the three hundred boys that expressed a liking for the trade, the instructor definitely gave a favorable opinion in 184 cases, and in only 82 cases out of the 231 did the instructor's rating show that the boy would probably not make good.

Information of this sort is of value only as it is used in connection with other personnel data, but it does give some idea of the boys' interests. One particular data sheet seemed significant. The boy had been in the print shop, liked the work very much and wanted to follow it as a life occupation. The instructor believed he would make good at it, but the father was a printer and didn't want his son to follow this occupation.

Some very significant answers were brought out as to why the boys liked the shop work, and why they did not like it. They liked it because "It's interesting", "It is new", "I like to make things", "There is variety to it", "Because the machine does the work", "Because I did not have to think very much", "Because it is easier", "Because I like to run machinery", "Because it prepares you for something you are liable to meet in every-day life", "Because it gives you ideas how things are made", "Because I got an idea how machines work". The boys did not like the work because "It is hard on the eyes", "It is monotonous", "It is tiresome", "It is too dangerous", "It is too mechanical", "There is no excitement in it", "There is not enough money in it", "Not enough future", "Too hard work."

Information such as this has a very definite value in the personnel files, particularly if it is used in connection with other data which is also significant. But such replies as have just been noted bring out some other things relative to the general shop courses which are significant in another way. From their own statements we find that the boys are getting some of the things which we have set up as objectives. They are getting an understanding of how machines work, of how things are made, and of the working conditions and monotony and dirt under which men in certain trades have to labor. So that we may quite safely assume that both of the objectives mentioned in the earlier part of this paper have been, to some extent, at least, realized. The boys are getting an understanding of certain portions of industrial life of the community, and are getting certain intimate contact with these trades which enables them to more wisely choose their life work.

As a general proposition, the general shop courses have met with favor on the part of most of the boys, and have furnished a means of providing understanding of the trade and industrial life of the community not previously obtainable by these boys. Quite a number of the boys have changed their courses and entered one of the shops. Others have definitely found out that they do not want to follow these trades. The general shop course is yet new in the Joliet Township High School, but it has found a place that seems secure.

The Tool Chest in Education

Laurence Parker, Kansas State Teachers' College

FOR several years there has been much discussion in press and elsewhere as to whether or not we were approaching a state of saturation in the automobile business. By such a saturation point, I understand them to mean the point where everyone who can afford to do so will be owning a car. I am not much interested in just when this time will come, but I feel that a state of saturation in another industry is fast approaching, if it has not already been reached.

My business takes me into many manual training wood-working shops during the course of a school year. Perhaps I am a guest when there and I should not talk about them behind their backs after leaving. To avoid a criticism along that line I am bursting into print to

talk about a state of saturation which is connected with one of their outputs.

It seems to an observer as if the manufacture of cedar chests in high school shops is reaching a point of saturation. If there is not at this time at least one cedar chest for every moth now in existence, there soon will be. It must be a very discouraging situation for the moths to face. Some of the manual training instructors realize the situation, and while they are kind hearted and would not like to have their activities put even a moth out of business, they realize that the cedar chest makes a fine exercise for the wood-working shop.

If the manufacture of cedar chests were to stop today, by decree or otherwise, it would make a tremendous hole in the activities of the wood-working shop and so I hasten to suggest a substitute for this old reliable product.

Suppose that when the wood-working teacher met his classes for the first time he were to take them over to a corner and unlock the lid of a white pine or cypress tool box. This box was made by the instructor, himself, and represented some of his very best work. It would be a box that anyone would be proud to make and to own. This exhibit would be a novelty in almost any shop for most students do as the instructor tells them to do, and not as the instructor has set an example.

Inside the tool box would be a reasonable assortment of wood-working tools every one of which the instructor had picked up in the second-hand market and had put into good condition. Inside the lid, perhaps, would be a list of the tools and just what each one had cost and the total cost of the lot to date. If there were any hope for the efficient instruction of those boys, their hands would itch to be able to raise the lid of a similar box of tools of their own.

The instructor would then tell them that during the time they were in his classes they would be allowed to make a similar tool chest, and the instructor would help them to pick up a similar set of tools and get them into shape. He would further tell them that as they got these tools together they would be allowed to do all their work with them. This would enable them to do better work than with the tool outfits used by the other boys. As a result he would be able to give them a better mark, grade or credit than they would otherwise receive.

The results of such a program would be many. First, the boys would get training in bargaining for something that they wanted. Where can you get better training along this line than in a second-hand store? Then, too, the boy would get a love for tools, which is hard to acquire when you are using tools used by several other boys during the course of each week. When the boy's wood-working training is over in the high school, he would take with him a handy set of tools with which he can work, instead of leaving behind him a battered set of tools used by a number of other boys. He would have received training for his life work, the ability to look after, watch over, protect, and maintain something that belongs to himself.

I hear a manual training man say, but we are not training carpenters in our shops, and the boys will not have any use for the tools after they leave school. This may be the case in some instances. The boy who really does not care for the tools will, if he is any trader at all, get rid of his kit and get something that will serve him better in their place.

There may be boys in the classes who cannot afford to spend money for such tools. This is a good opportunity for the luncheon clubs to get behind the plan and provide a revolving fund for the aid of such boys. It will not take a boy long to pay back the fund by easy payments. Without doubt the boy who has the most difficulty getting the tools will have the most use for them afterwards.

The automobile made auto mechanics of us all, and a list of metal-working tools desirable to have. Now the radio has come along and added other tools to the list we have and use. Who can say what conveniences would be added to the home if the boy brings home a good kit of wood-working tools which he really knows how to use?

PRINTING—A Developmental Subject Capable of Close Correlation with all Subjects of the Curriculum

Wm. R. Baker, Head of the Printing Department, Sioux City, Iowa

PRINTING, when properly presented in the classroom can be made the vehicle of practically every common school subject, meaning for example, English, methematics, science, history, civics, health, drawing, and a host of others, for, has not their progress been achieved through the art of printing?

The student who enters the printing course of a school does not necessarily need to become a printer any more than, for instance, the boy who takes arithmetic, is required on account of his having taken arithmetic, to become an accountant or a banker.

However, what industry is there that enters into as many walks of life, or is more closely linked up with our daily work, than printing and its allied arts? None. And yet, how very few people are in the slightest way acquainted with the processes of the industry, or even able to speak intelligently regarding a job of printing, notwithstanding the fact that they are in close contact with some form of printing almost continually. For instance, do you know how your morning paper was printed? How the different materials, ink, type, and paper were manipulated by means of clear thinking to turn out a complete product in an incredibly short time? Is the work up to standard? Is the news real

news? Do the editorials set forth keen arguments? Do the advertisements "put across" their message? Surely you are interested in some of these things. Do you know if the paper was printed on the same sort of stock as is used to make up your writing paper? And having determined this, how would you procure this paper of a certain quality, should you desire to purchase some? What are the good and bad qualities of paper? Are these not justifiable ends? Yes, even as justifiable as the computation of compound interest.

The real demand for printing in a curriculum is not always for a trade course. While it may appear that the demand of a community is such as to require the teaching of printing as a trade subject, still more often upon a careful study of the local situation, even in the larger cities, it comes to light that the annual demand for the output of a printing school is not nearly as large as it was first thought to be, and quite often will be found to be so small as not to justify an actual trade course with the idea of turning out a specified number of workers each school year. What then is to be taught if printing as a school subject is to be justified? The educational side—the developmental side—is the answer. This should be the true aim of the really successful school print shop. This is the fundamental element that justifies the teaching of printing, and is the thing that is really at the base of the ever increasing demand for school printing classes. Appreciation of well created, well arranged pages, a keen eye for tasteful coloring, a knowledge of type faces so that the type in your advertising copy will really work for you and not merely carry black ink, and above all the stimulation of a demand for superior workmanship, are some of the ends that justify the expenditure of public moneys for school print shops. Develop these fundamentals.

One often hears the complaint from the trade, of uselessness of "spending so much time in spacing lines on the cheaper jobs." The printer did not actually say that careful and correct spacing were poor typography, but he did infer that the majority of customers do not demand or pay for good typography and for that reason it is a waste of time to practice it or even train along that line. Then, is it not a justifiable end to educate the consumer to expect, and even demand, better workmanship and keener design? Is not the best way to be found through educating the younger generation who are to some day fill father's shoes?

Is, then, the teaching of the printing trade courses justifiable? Where the law of supply and demand advocates it—*yes*. Can the printer afford to use his productive time to competently instruct apprentices? Not as a rule. It is, therefore, the business of the school to make a study of this situation with the idea of placing the burden of training where it rightly belongs—in the school. For example, as a preliminary, let the student work out a few forms, actual work, practical work, and in a few months of careful supervision, it is easy for the boy himself (as well as his instructor) to determine whether he wants the trade or whether the trade wants him. As much time and thought should be placed upon guiding workers entering trades or professions, away from any form of life work for which they are not adapted, as there is spent in trying to make them over into niches where they do not belong. This is not at all a new idea but is continually kept in the background when it should have a full place in the light. Such a procedure is not only beneficial to the trade but is also really doing the beginner a good turn. Don't flood the market with doubtful boys.

School printing also has a productive value that must not be overlooked. While, without question, large amounts of money can be saved by successfully operated printing departments, there is a still more important angle from which this problem of actual saving should be viewed. The opportunity the school printing class affords for planning, working out, trying, testing, and finally creating textbook material, classroom material, and other printed matter that never would be obtained, attempted, or even thought of, if it meant an actual outlay of money as required through regular printing channels, is of far greater importance than the saving made by the mere printing of letter heads and office forms for the school board. Printing as a self-supporting branch of education is far ahead of any other subject thus far offered.

Still another point: Changes in methods of manufacture during the last decade have made it next to impossible for a boy to enter a shop or factory and get the kind of training that enabled his father to become an all-round skilled artisan in his trade with a capacity to win promotion. The printing industry is no exception. Manufacturers' desires for larger dividend, efficiency systems, bonus systems, piece work, and the like, are to blame for this situation and these inducements make for speed, dexterity, and enlarged production, but usually center all the workers' faculties on one or at the most, a few operations taken out of the trade. Some steps, such as evening schools, correspondence schools, and short courses, have been taken to alleviate this condition but it is still evident that there is great need of still further work to be done, especially among the young workers before they have entered for good the rut of specialization. This work can be most economically done between the ages of 14 and 19 while the mind is still in a comparatively pliant stage and while the earning capacity is still at a minimum. The school is the best equipped to do this. The work should be broadened in scope, and kept broad rather than any attempt at intensifying. On entering the commercial world the worker soon comes in sufficiently close contact with the intensifying process.

These points together with the close correlation possible between printing and other subjects of the school, so evident to all, make printing as a subject one of the very best in any school.

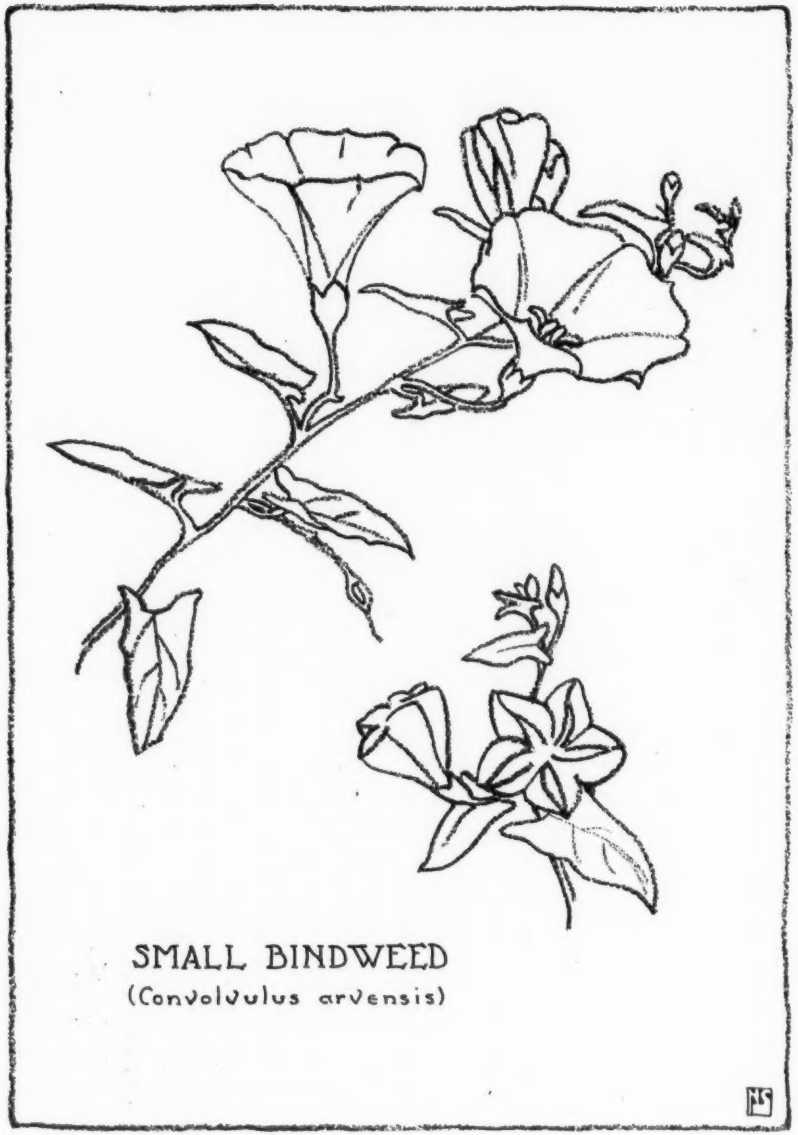


PLATE 9.

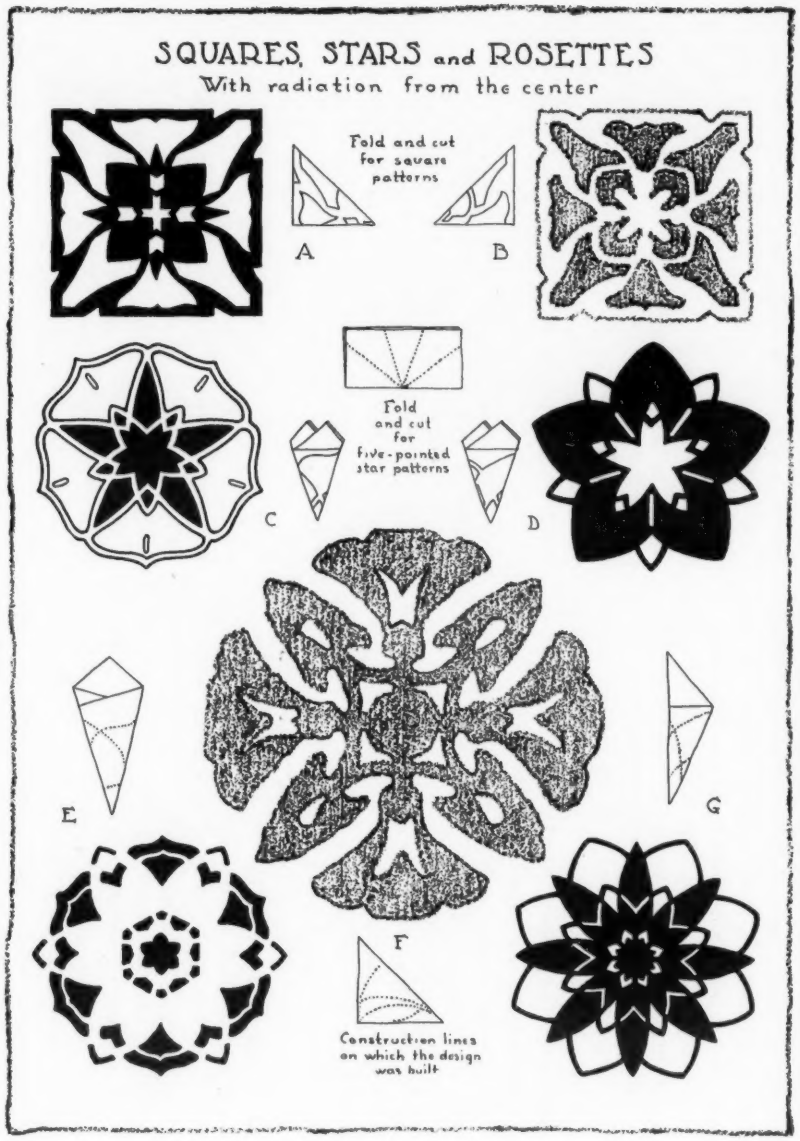


PLATE 10.

Wild Flower Designs

Article V: Squares, Stars, and Rosettes

Nettie S. Smith, Smith Center, Kansas

Small Bindweed. This member of the morning-glory family is a native of Asia, but is common in most parts of the United States. The vine is trailing or twining; the leaves are sagittate—shaped like arrow-heads; and the flowers are mostly white tinged with pink and with the star-like part of the corolla of a purplish color. They are sometimes called Hedge-bells.

Radiation. This little flower is an example of radiation from the center. Plate 7 shows how rhythm and unity can be brought about by radiation from an axis. Radiation is usually evident in a design unit. It may be radiation from an axis, from a base, from a point outside, or from the center. Plate 10 shows a number of abstract designs developed from this flower all radiating from the center.

Forms. A designer often needs to make patterns to fit definite forms as the square and the circle. One of the most efficient ways of doing this is by folding and cutting. The pieces thus made may be used directly as cut paper ornaments, or they may be used as patterns or stencils, outlined and filled in with ink, or developed in other ways.

It was a fascinating experience to cut a great many of these lacy patterns from green, pink and purple tissue paper, and pin them to a net curtain while judging their quality and making selections. These were cut from four-inch squares of tissue paper, excepting the largest one which was torn from a five-inch square. If heavier paper is used the pieces must be larger to secure accuracy.

Plate 10. *A* was made by cutting a leaf form on the diagonal of the folded square, and a side view of the flower on the diameter as shown in the small diagram.

B is a slight variation of *A*.

C was suggested by the top view of the flower. This made use of the five-pointed-star fold which is a little more difficult than the others. The square is folded in half then this is folded in five parts.

D was suggested by the top view of the half-open bud.

E and *G* are more abstract rosettes having six and eight sides.

F was made larger so that it could be torn out.

Construction. The small diagrams show how to fold a square for each pattern given. Those for *A*, *B*, *C* and *D* show how to cut, while those for *E*, *F* and *G* show the construction lines on which the designs were built up. These are the lines that give plan to the designs and lead the eye through the pattern.

Endless Variety. There is enough work suggested in Plate 10 for many lessons. Each pattern may be tried on the three-part fold, the four-part fold, the five-part fold or on any one of these doubled again to make twice the number of sides. Refer to Plate 2 for the three-part fold. When this is folded once more it makes the six-sided figure or the six pointed star. This is used in making snowflake patterns.

Every flower will offer some suggestion for rosettes. The flower form itself, or any one of its parts, may be used for the motif. When the student has gained a little skill in making these patterns, he will want to return frequently to this means of expression to try out new ideas, and he will never lack for original designs.

PLATE 10.

A Good Way to Teach Mechanical Drawing

Edwin S. Frash, B. S. M. E.

The subject of mechanical drawing must be presented to different classes in the junior high school in various ways. It must also be presented to individual students of each class in different ways.

My experience has taught me that I must first study each student and find out his strong points and his weak points. I find also that I must change his opinion of mechanical drawing from one of mystery and dryness to one of simplification and interest. This is not always an easy thing to do. The most effective way, however, is to impress on his mind the fact that mechanical drawing is another means of expression; another language in fact. To illustrate this I write on the blackboard, "I see a block which is two inches wide, four inches long and one inch thick." Then, without saying a word, I draw the block and thus impart the same information as by words. Usually every student gets the idea.

Another well tried method of creating interest is to state that in the study of English we use words to express our thought; in mathematics, figures; while in mechanical drawing we use lines and figures.

The first exercise I give is a simple wooden white block. Since no two are alike, there is no danger of copy work. Two views of the block are required. Because this is the first exercise, more time is spent on it than on any of the others that follow.

The second exercise is a simple red "T" block. Two views are required of this also.

Usually, on the second block or exercise the brighter boy begins to make more progress than the slower boy. However, it is still too early in the history of the class to make any changes.

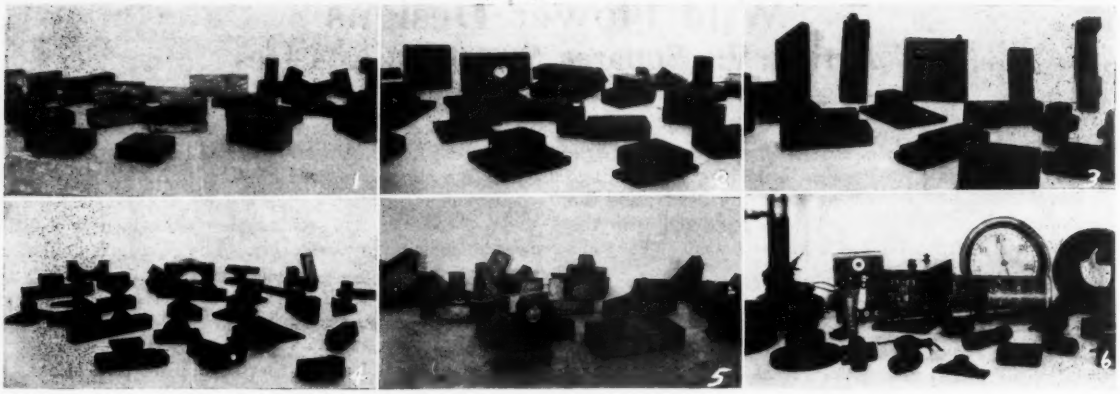
The third exercise is a combination of the first and second blocks, made by laying the red block on the white one (Fig. 1). As can readily be seen, this is a fair test of the student's ability and also lends itself to many different problems. The students who make the best progress on this exercise, are shifted so that they compose a group or squad by themselves. This is No. 1 squad. I prefer the name squad because it is a term used in engineering offices.

Those students who are not so good are seated together in squad No. 2, and those that are very slow compose the third squad.

Now the class has been broken up into three divisions instead of one main division, which permits a closer study of each.

My next exercise is a series of black blocks, all of which are different but represent the next principle in Mechanical Drawing (Fig. 2). These are given to each student of No. 1 squad. As each student gets his block, he goes to the board and draws free hand the top and side views. Any needed corrections are made at the board. It often happens that I can drive home many good ideas to the students just from a simple sketch on the board at this stage of the course.

PLATE 9.



BLOCKS, CASTINGS, AND OTHER OBJECTS USED AS MODELS FOR MECHANICAL DRAWING.

After the student leaves the board he proceeds to make two views of his block.

Squad No. 2, in the meantime, has gone for a review of either the first or the second exercise. Usually it is the second.

Squad No. 3 is still working on the first exercise.

I do not experience any trouble in the squad system at this time, for I take pains to make it very clear to the slow boy (of course he is not told he is slow) that he does not have to hurry and become nervous as I want him to take his time and get the general idea so well that he can never forget it. When he is told that he can go just as fast as his ability permits, he takes renewed interest. And before a great while there is not a great line of demarcation between the squads.

As a student understands the subject better, he is advanced from one squad to the one next in advance. At the same time, should a student develop any weak points, (and some do) in the advanced squad, he is moved back to review the points which are not clear to him.

The next series of blocks, and just one step further in the study of the subject, are painted green (Fig. 3); the next series orange (Fig. 4); and the final series are painted blue (Fig. 5).

So far, almost all of the students' work is done from models. I find this to be the most sucessful method of starting a student in mechanical drawing, for he is better able to see a straight line in a model than in a sketch on the board.

Not all of my models are of wood. In order to obtain enrichment, I have several hundred small castings that serve well in illustrating the fundamental principles of the subject.

Further along in the course, the student is given models in conjunction with his other studies, such as a printer's type case, various wood joints, sheet metal pieces, etc. And when he studies batteries in science, he is given a battery to draw up in the mechanical drawing room (Fig. 6).

So far this article has treated on the subject of drawing as it pertains to the regular curriculum of the high school. But there is still a broader field for it to serve.

Each student who comes to me fills out a card and one of the several questions asked is, "What trade do you expect to follow?" Many of the younger students do not know, but the greater percentage of the older boys have a fair idea of how they expect to make a living after leaving school.

I study these cards very carefully and try to give each student exercises and advice that will assist him in his future work. Not only do I get this information from the boy, but I go out into the surrounding industries and obtain information as to position, kind of work, and amount of pay possible, so as to better advise him. The result is that many of my students are able to obtain summer employment along the lines of work they are most interested in.

Some will say the keeping of a roll call in a drawing room, using the squad system, would be very difficult. It is even easier than keeping the regular roll call book. I print each student's name on a small card and have provided the large flat drawer of my desk with a series of slots in which these cards can rest. Each name is always in sight. As the student shifts his place his card is shifted. At the end of the semester the grades are copied from the cards into the regular roll call book as a matter of record. I find metal signals on these cards very helpful in designating some particular fact regarding the student under direct observation.

There are other ways of teaching the subject but from the use of the squad system and the model system that I have employed several years find these facts:

Students are constantly coming to the drafting room to do extra exercises.

Students are constantly trying to get their schedule changed so as to get mechanical drawing.

Students do practically no class cutting, neither do they lose any time in getting to work as soon as they come into the room.

And the most gratifying fact is, that I now see some of my young men in good engineering positions, most of them with a bright future.

It is hard work, but after all it more than pays in the satisfaction of knowing one has been able to assist a student to find his place in the world.

A FINE EXAMPLE OF THE VALUE OF PAINT FOR RESISTING THE WEATHERING OF WOOD.
(Photo by U. S. Forest Products Laboratory.)

Laying Out the Work

C. C. Hermann, Moline, Ill.

The crucial test of a good machinist is the laying out of his work. By the pains and accuracy, coupled with the thoroughness that he practices in laying out the work, his caliber and ability are made known. Accuracy and thoroughness in this most important operation is painfully lacking in our modern machine shops. The result is that considerable loss is sustained by the industry or shop, and the completed job is considerably higher in cost than should be the case. As an example, I cite a die casting weighing 250 pounds and produced for the purpose of manufacturing steel wrenches. The casting was of semi-steel and true to pattern. The machinist who laid out the casting made an error in the location of the die recess, with the result that the casting plus forty hours of machine labor were lost.

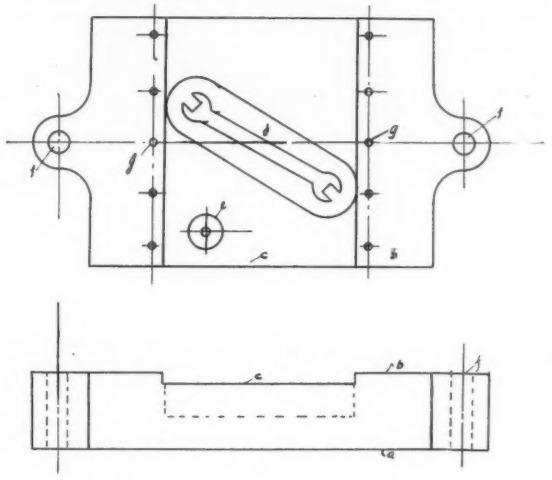


FIG 1

Of all the subsequent operations, all of which are important, the layout is of greatest importance. This explains why the best men are picked for the layout work and the less efficient workmen are retained on the machines to follow the layout lines. The layout men are invariably paid the higher rates, generally have the best light, and are accorded other privileges and desirabilities over those accorded the machine men. The young man intending entering the machine shop, and taking up this work as his vocation, will do well to pay more than passing regard to layout work.

Layout work consists essentially in placing such lines on the rough castings, forgings and other pieces, as they are received into the shop, and as shown on the drawings provided. Occasionally this operation is performed on partly finished work and not infrequently the piece comes back time and again to the layout bench for further location work or layout. In short, therefore, the layout is the designation of exact location and nature of the operations specified in the drawings.

Layout work may be divided into two phases, namely, preliminary and final. The preliminary layout work is principally to determine the suitability of the piece for the work intended. Not infrequently we find castings designed, the pattern made and the casting poured for a piece, only to discover that an error was made in the drawing for the pattern resulting in the casting being entirely unsuited for the work at hand. This must be discovered, if it exists, before much machine work has been placed upon the piece. Return to the wrench die mentioned above and shown in Fig. 1, which shows the lower half of the punch or planking die only. The bottom (a) face (b) and the recess (c) must be machined before the die recess (d), punch die (e), leader pin holes (f), and stripper plate screw holes (g) can be located. The careless workman doing the layout work proceeded regularily with the preliminary layout, which consisted in locating the thickness of the casting between the surfaces "a" and "b," also the location of the recess "c." This machine labor was all placed on the die. There was no loss so far however, when he came to laying out the recess "d" he made an error. In this second layout he provided the lines and centers required for the various holes, leader pins and the die "e." These holes were all machined into the casting and the recess "d" likewise sunk. Now when it came to matching the bottom die up with the top or punch die of the set, it was found that the recess "d" was out of line. The error could not be corrected on this casting and retain the necessary strength, so it was junked and a new casting obtained. Here was a case where the pattern and the rough casting was correct but the layout man caused the loss and consequent rejection through error.

The preliminary layout on this casting would have caught any physical defects in the casting which would make it unsuited for the work. It would reveal whether or not the casting was too thin or did not possess the correct dimensions with regard to surface. In short the preliminary layout consists essentially in laying out the work with regard to outlines, checking the rough piece and otherwise inspecting the piece prior to expending any considerable machine time thereon. Occasionally the preliminary layout proceeds to the point of doing some of the machine work in order to thoroughly satisfy the one responsible that the piece will be suitable. For example, return to the wrench die. Occasionally we obtain castings

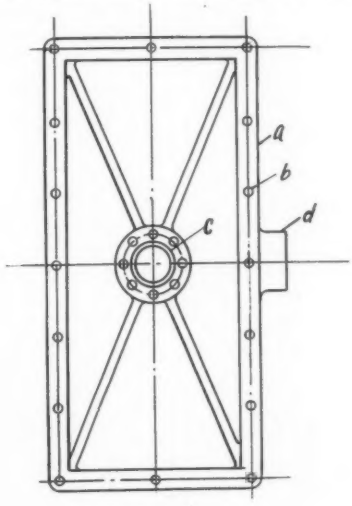


FIG. 2.

in the form of die blocks particularly with considerable dirt and honeycombing along the top surface. Many times this condition is merely surface but occasionally it extends into the casting sufficiently as to result in the casting being weak. The preliminary layout man must take

this into consideration, and where he is not sure of his ground, he should be privileged to have a roughing cut taken over the surface to determine the depth to which the dirt may extend. I have known this method to save many cast blocks which would have otherwise been rejected.

The example of the steam chest cover shown in Fig. 2, defines admirably the layout work with regard to preliminary and final steps. The work is first beveled up on a face plate and the edges "a" as well as the thickness, are laid out by scribing on it such lines as will designate these dimensions. The work is then placed on the planer and machined to the lines and dimensions noted thereon. This step completes the preliminary work on the piece. It is then taken back to the bench and the final layout is made locating the lines of holes "b," the circle of holes "c" and the machining work necessary on the boss "d" consisting in boring the hole and drilling and tapping the holes for the flange coupling. In the final layout all lines and centers are placed where they will not be obliterated too early in the machining operation, and the lines are preferably made so that they will be visible after the machining is completed in order to permit checking the machining readily.

This layout work is preferably done by men specializing in layout and benchwork. There are many advantages resulting to the shop by handling the work in this manner. The men soon become expert in eliminating errors that otherwise creep into the work. The work can be properly placed on machined face plates for the layout, and the men encouraged to possess and take care of the high class tools required to accurately prosecute the work. The machines can be kept busy operating at their highest capacity because the men at the machines need not stop in order to do the layout work. The machines would stand idle while the men performed the layout work. One thing I have noticed where the machine men do their own layout work is that the work is insufficiently planned. The work is set up on the machine, which requires considerable time and accuracy, and a machine cut taken. It is soon discovered that the work must be removed from the machine in order to place another layout line on same, and the setup must be done over. This results in considerable loss of machine and machinist time, whereas where the layout work is performed by skilled layout men, the second setup in all probability would be eliminated. A principal advantage, therefore, of having men specialize on layout is a preconceived plan of the machining operations.

Another important advantage of having layout men in the machine shop who specialize on bench layout is that work may be planned far ahead of the machining operations. There is no occasion to work hand-to-mouth. As soon as the castings are received in the shop they may be laid out with regard to preliminary lines and their suitability for the work intended determined. Then should it be found that the piece must be rejected for some cause or other there would still be time to obtain a new casting without loss of machine time, and the necessity of making a partial setup and then tear this down again. Considerable work can thus be kept ahead of the machines and the shop in general kept producing at its highest pitch and efficiency.

The Furniture of Our Forefathers and Our Own

Chas. A. King, Plymouth, N. H.

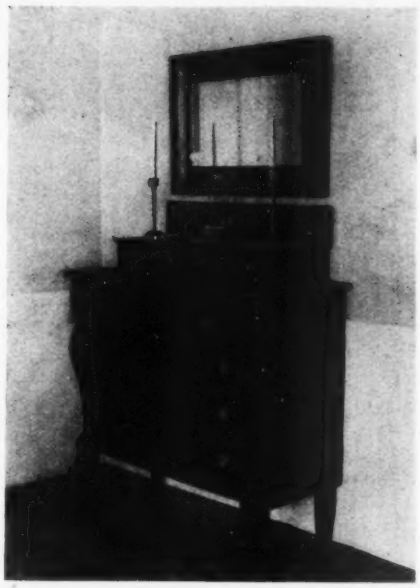
THE beginnings of furniture, like the beginnings of many things in common use, are shrouded in the haze of the earliest history of man. No record tells us who made the first furniture, or who discovered the general dimensions of essential furnishings. Certain it is that furniture was based on human needs, evolved from physical environment, and modified by racial, social, and religious customs. The influences which were potent during the earliest times continued to function during all of recorded history. We have traces of them in the earliest civilizations, and we have interesting records in the story of Egypt, Greece, Rome, and other nations of antiquity. These records become clearer and stronger in the dark ages and in the middle ages, and become fully complete and interesting as we approach the last century. The story of American furniture is not the least interesting, beginning as it does shortly after the settlement of Plymouth.

Probably the first attempts at furniture making in America were limited to the most easily available materials and the simplest forms of construction; hence, as among the settlers of our later Western frontiers, puncheon tables and stools made of split pine logs, straightened with axe and adze answered the purpose until better could be provided. Soon many good pieces were brought from England by Crown officers and well-to-do immigrants; these pieces prevented dry rot from possessing the local cabinet-makers and furnished inspiration for them and for the handy men who copied as far as their ability and tools permitted.

The Early American Cabinet Makers

It seems that John Alden was the first, or one of the first, of the furniture-makers of the Plymouth colony, for we learn that there were several competent woodworkers before 1625. Few of their earlier attempts are extant, however, for at that time the only seasoned wood from which permanent furniture could have been made must have been brought from over the sea, which was hardly probable. Other furniture-workers were scattered through the northern colonies, until in the year 1690 a "Furniture-Worker's Guild" in the Massachusetts colony numbered more than one hundred members. The southern colonies, Virginia, Maryland, and the Carolinas, attracted few artisans, hence their leading people imported nearly all their furniture from Europe. However, as commerce between the colonies developed, the furniture needs of most of the settlers were so well served among themselves that they enjoyed as great a degree of comfort as their European friends, and the number of pieces ordered from England became fewer in proportion to those made by colonial cabinet-makers.

After the Plymouth settlement had been established upon a log cabin basis and immediate needs and comforts assured, the settlers, looking to the future, prepared for permanent houses during the winter months. From the woods of their own holdings, timbers were cut and squared with whip saw, axe, and adze, and a few unusually fine logs were cut into sizes suitable for furniture-making and stacked away to season. Pine was the favorite wood for chests and tables for common use. For the finer furniture, oak and walnut were the favorites, both in England and in the Colonies. Many trees of these woods, as also of maple, red birch, wild cherry, and other hardwoods, were found in the forests of such size that perfect wood could be split or sawed from them. Early in the first quarter of the eighteenth century mahogany began to



AMERICAN EMPIRE WITH ITS LAVISH USE OF CROTCH MAHOGANY VENEER, ITS HEAVY AND OFTEN UNGRACEFUL LINES.

arrive in America and Europe, and in time it became the favorite wood for making the finest furniture.

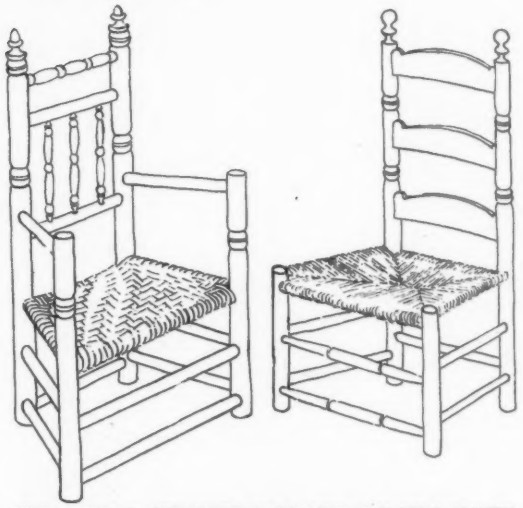
European and Local Influences

Capable artisans, trained under master craftsmen of Europe found their way to the Colonies by almost every ship load of immigrants. Hence the beginnings of American furniture were strongly influenced by the furniture of the Stewart, Cromwellian, and Restoration periods, and later by the Carolean, William-and-Mary, and Queen Anne periods. The finer inlay, Boullé work, marquetry, brass trimmings, etc., were seldom used in early American furniture. Even in the post-Revolutionary period and the early nineteenth century, materials for such work were difficult to obtain. This forced American craftsmen to design their own furniture embellishments; hence the great variety and grades of merit of carvings, panelings, moldings, turnings, and wood trimmings. The carvings were based upon the bold Runic, Saxon and Gothic motives as they were interpreted upon European furniture which reached the Colonies. Occasionally a suggestion of the delicate and refined acanthus, honeysuckle, and other motives characteristic of the Mediterranean races is found, more especially in the latter part of the eighteenth century.

Many examples of crude attempts at carving are found upon various Colonial pieces like, for example, the Hadley chests. Scratching, cutting with a knife, or veining with a small gouge or V tool were methods of expression used by some indifferent or mediocre workman who had not learned to stop when a piece of work is completed.

Though brass trimmings were imported and in a few instances made by metal workers of Colonial days, genuine brasses applied to American Colonial furniture are rare and of great value.

Thus were evolved the furniture types characteristic of the American colonists. Strength and permanence were demanded, and every piece conformed to simple laws of proportion and form as an unconscious tribute to innate demands for beauty. But not always was comfort considered an essential, for often the stern creed of the times influenced the design of furniture. The strictest of the Puritans considered any concession to ease and comfort a compromise with satan, and a sinful indulgence of fleshly weakness. Regardless, however, of the austerity of the early colonists, socalled vanities of English and continental life found their way across the stormy sea and suffered no lack of devotees among the settlers. We may judge this from the manifests of cargoes sent to the colonies, and the authentic pieces of fine furniture, wearing apparel, and other frivolities still shown with pride by their modern possessors.



FIGS. 2 AND 3. STRAIGHT BACK ARM AND SIDE CHAIRS WERE RESERVED FOR THE MASTER OF THE HOUSE AND HIS GUESTS.

Colonial versus Present Manufacturing Methods

The method of preparing furniture materials used by the colonial cabinet-worker and the cabinet-maker of the present day afford strong evidence of the changes which have taken place in the past 150 years. The colonial cabinet-maker used a "whip saw" to work his lumber to dimensions. This saw was operated by two men, one standing on a trestle or over a pit, and the other below the trestle or in the pit. Today all wood for cabinet work is handled on machines, so that the cabinet-maker does little more than assemble the furniture and give it the finishing touches. In colonial days, lumber was air-dried and seasoned over a period of several years. Lumber at present is sometimes used within a few weeks after it has been cut and dried in a properly operated dry kiln. The old-time craftsman prepared his own glue and finishing materials. Today these materials are manufactured by specialists. In fact, very few cabinet-makers and furniture finishers know anything about the extensive and intricate processes or the chemistry of making glue, varnish, and other commercial finishing materials.

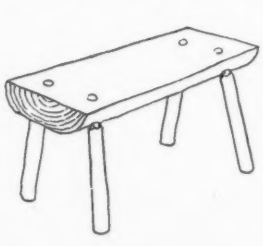


FIG. 1. PUNCHEON TABLES AND STOOLS MADE OF SPLIT PINE LOGS STRAIGHTENED WITH AXE AND ADZE.

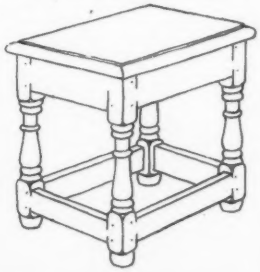


FIG. 4. STOOLS BEING CONSIDERED SUITABLE FOR EVERY ONE ELSE.

Small pieces of wood to be turned, or steamed and bent, were split with the grain, or riven, in colonial days. This explains why spindles, curved pieces, turned legs, and other delicate parts of furniture made in the early days are still in use. At present such pieces are sawed from odds and ends, or cut from planks, with the thought of utilizing every possible bit of lumber. The colonial craftsman cut curved pieces from wood in which the natural grain closely followed the desired form. Time alone will tell whether the furniture of the present day in which grain is often ignored will survive as long as has the furniture of colonial times.

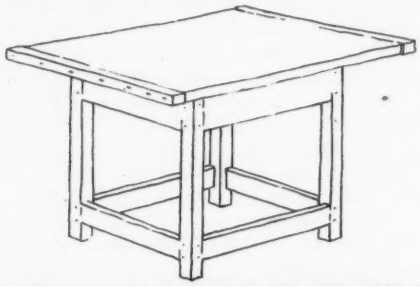


FIG. 5. REFECTORY OR TAVERN TABLE WITH FOUR RAILS WHICH BECAME SO BRUISED BY THE HEAVY "JACK BOOTS" OF THE TIMES THAT PURITANIC THRIFT WAS OFFENDED.

The basic organization of the furniture handicraft in the colonies was radically different from the furniture industry today. A master craftsman would walk alone until he had more work than he could do; then he would take an apprentice, usually one of his own sons. Perhaps he would also hire a journeyman or two, as the demand for his product rose. Even then, every person in his employ was in effect an all-around worker, handling custom or ordered furniture. Few pieces were made to be kept in stock ready for immediate sale. Modern methods of mass production were unknown. It was only the advent of the woodworking machinery about the middle of the last century which cheapened the cost of production, injected new standards of house furnishing into the mass intelligence, and gave rise to the modern furniture industry.

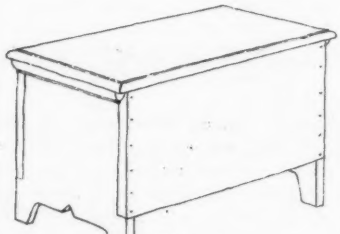


FIG. 6. THE SIX BOARD PINE CHEST WITH BOOT JACK OR SIMILAR ENDS EXTENDING TO THE FLOOR.

The common method of purchasing furniture in the colonial times persists only among a few connoisseurs of the present day who are able to indulge their taste and fancy for unique and individual pieces. A pronounced difference exists, however, for the present lover of fine furniture buys it for decorative purposes, while our forefathers bought only what long consideration had shown to be needed to satisfy a family need. The colonist would not consider the possibility of replacing his furniture with new pieces when he became tired of it, or when the style changed. His selections were so carefully made that he guarded against a reversal of taste, and changes in style came so slowly that they rarely affected conditions. The ideals of necessity and the appreciation of good design and construction harmonized with the ideals of the craftsman, as no other had come within the knowledge of the people.

Colonial Furniture Details and Special Pieces

In the olden days household furniture emphasized the dignity of the head of the house and the respect due elders, for straight back arm chairs and side chairs were reserved for the master of the house and for his guests, and stools were considered suitable for all others. The furniture did not conduce to lounging for the backs were straight and unyielding, the seats were comparatively narrow, and the lower rails or stretchers were so placed that the feet could not be drawn underneath, but could only be rested upon them. While foot rails were placed where they would give the greatest strength, they became so bruised by the heavy "jack boots" of the times that Puritanic thrift led to the introduction of medial stretchers to join the end rails in the middle of the width of tables and the side rails of chairs. This improvement became permanent in certain types of chairs and tables,

FIG. 7. A CONNECTING LINK BETWEEN THE CHESTS AND HIGH BOYS WHICH WAS DEFINITELY INFLUENCED BY EUROPEAN STYLES.

but later a rail was placed just at the height to strike the shin bone of the person sitting at the table. Still later the rails of tables were so placed that the knees could be pushed under the top rail; the lower or foot rail disappeared from tables used for dining, writing, or games; and in some types of tables curved stretchers were introduced to connect the legs diagonally. This last arrangement was a compromise between utility, strength, and good design. Thus, it was recognized that strength, beauty and economy could be made to subserve comfort by omitting superfluous wood, or at least by placing it differently.

Chests were among the first and most needed pieces of furniture required by the colonists. Simple six board pine chests, with boot jack or similar ends extending to the floor, were common. After the earliest times, chests were set upon balls, turnips, or other forms of feet or legs. To such chests, a drawer was added at the bottom, and then another, and in time the chest cover was fastened to the sides and the entire chest became a case of drawers.

Later one chest was placed upon another and the "chest on chest" was developed. From this it was but a step to placing the chest on a frame or stand and fitting another chest upon it until the "low boy" and "high boy" appeared about 1690. During the eighteenth century various modifications and adaptations were developed, conforming to contemporary and local ideas.

Figure 7 illustrates a connecting link between chests and "high boys," which was definitely influenced by European style. The curved legs in this piece show a strong Flemish influence. William-and-Mary designs and details, the broken arch or bonnet top, and cabriole

MASSIVE PROPORTIONS AND RUGGED CONSTRUCTION OF MISSION FURNITURE.

legs of the Queen Anne style were modified to suit desired dimensions; these details and designs have had a strong influence in American furniture from that time to the present.

Present Day Colonial Adaptations

Well cared for or restored pieces of seventeenth century furniture are still in active service, and many eighteenth century types and styles so adequately fill the needs of the present time that copies are made under conditions of mass production and sold at popular prices. For example, adaptations of slat or ladder back chairs, bannister-back side, arm and rocking chairs, with cane, rush, or splint seats, and Windsor chairs, fiddle or splat-back chairs—all of excellent design, workmanship, and finish may be purchased for every purpose. Also gate leg tables, butterfly tables, and other tables of various types, high boys, low boys, chests of drawers, in fact, all articles of the old time which can be adapted to satisfy a recognized need in modern homes, are now made in general conformity with the furniture of the colonial period, and may be found in modest homes of people who cannot afford to purchase genuine antiques. Though new forms have been devised and adapted to meet modern needs and methods of manufacture, they are based upon the proportions and form of the old furniture. Probably the strongest reason for this is that no other proportions or forms have so successfully met human needs, nor so universally satisfy discriminating taste, which is by no means confined to those able to purchase authentic antiques of the "Pilgrim Century."

In the design of furniture, the contest for the survival of the fittest continues as it does in all other phases of human existence. The designing of new furniture consists chiefly in selecting and adapting the most desirable elements which have existed for centuries, the skill of the designer being shown by his ability to combine them in a good ensemble. The present day designer passes over most of the furniture made since the first decade of the nineteenth century, and looks to the two preceding centuries for his motives. This fact is interesting in that it shows that the vision of the nineteenth century designers fell far short of the vision which animated the old masters.

The Transition from Colonial to Present Styles

The development of the American Empire furniture during the first half of the nineteenth century shows a progressive decline in taste. The lavish use of crotch mahogany veneer, the heavy and often ungraceful lines, marked the connecting period between the simplicity and beauty of the colonial furniture and the extreme ugliness of the atrocities which followed the introduction of woodworking machinery and mass production in the middle and second half of the century. These types of furniture caused a distinct lowering of the public taste, which resulted in a demand for novel over-ornamentation and low prices.

As taste declined during the Victorian period less attention was paid to the selection of materials and quality of craftsmanship, and the furniture industry adjusted itself to turning out quantities of mediocre furniture, over-embellished with jig sawing, machine-cut moldings, and molded panels. Manufacturers vied with each other in creating grotesque forms and in devising new filligree and gingerbread work to glue upon furniture. This continued with various changes until nearly the beginning of the twentieth century, when the revolt against such furniture gained sufficient momentum to convince many manufacturers that a radical change in the popular taste was in progress.

The "Mission" and "Crafts" Periods

As usual, public taste overshot the mark, and the very opposite extreme of over-ornamentation resulted. This was particularly noticeable in the Mission furniture in which straight lines, massive proportions, and rugged construction were the popular ideal. While interesting as a passing phase of the history of furniture, and on the

THE CRAFTS FURNITURE FORMS A BROAD MIDDLE GROUND BETWEEN THE BEST OF THE VICTORIAN AND MISSION STYLES OF FURNITURE, AND THE REVIVAL OF APPRECIATION OF THE FINER LINES AND TASTEFUL SIMPLICITY OF THE OLD MASTERS.

whole an improvement upon many of the Victorian styles, the possibilities for its misuse were great. Few homes had rooms of the size, form, proportions, decoration, or vista offering suitable settings for such furniture; therefore its popularity was of short duration. Probably many pieces of Mission furniture will be useful for several generations, for their strength and massive proportions insure immunity from most of the dangers which threaten furniture.

The reaction from Mission furniture was a compromise between the past and the present. Straight lines continued as prominent characteristics; curves and embellishments were introduced sparingly, and the result was the popular Crafts furniture. From this simple Crafts furniture, the evolution has been strongly in the direction of the reproduction of the old masters' work. The original types of Crafts furniture have all but disappeared as a popular style, while the later evolved type has demonstrated its adaptability to modest homes in which good taste and economy are urging their opposing claims.

The artistic merit and simplicity of the later Crafts designs have made them particularly adapted to the abilities and needs of the great number of manual training students and home workers who wish to make real worthwhile furniture. Appearing as it did when the popular taste was in the process of reformation, this furniture forms a middle ground between the best of the Victorian and Mission styles of furniture, and the revival of an appreciation of the finer lines and tasteful simplicity of the past old masters.

What of Newest Styles?

While the present custom which impels the mass of furniture buyers to confine their purchases to the prevailing "newest styles" may tend to perpetuate mediocre forms, an increasing number of discriminating purchasers are ever seeking better pieces. This tendency precludes the likelihood of a regression in the public taste. Apparently certain styles are established with as great a degree of permanence as anything may be, which is dependent upon popular taste. It almost seems that every possible deviation from good taste has been tried and measured, and that we are distinctly entering a period in which good taste will retain the best of what has gone before. Popular taste seems to recognize the value of simplicity, and there is good ground for the prediction that for a long time the new developments in furniture will be along the lines of reproduction and adaptations of the work of the old masters. The outstanding characteristics of such furniture have withstood the tests of time and have attained a degree of permanence which is most gratifying. It is unbelievable that the atrocities of the late Empire and Victorian period will ever become popular. This is true even though present day styles in dress offer no assurance that the dictates of fashion or of nonsensical fads will not always find followers.

Modern education has done much to improve popular taste in the selection of furniture. The growth in education, particularly along art lines, encourages manufacturers to produce styles which are simple and satisfying, and which will appeal to a rapidly developing class of buyers. The furniture manufacturers and dealers really stand on higher ground than their customers, and beckon the people to climb to their level in buying only the most tasteful furniture in the sales room. When commercial interests thus accept large economic risks, we may be sure that progress is being made.

The Duties, Qualifications, and Responsibilities of Directors of Vocational Education

S. Lewis Land, Lecturer, Department of Industrial Education, University of Wisconsin

I. The Director as an Executive

The purpose of this series of articles is to give to those interested in becoming fitted for direction of vocational education, and those now employed as directors, a survey of the duties, qualifications and responsibilities of such a position. It is the further purpose to give those interested in training programs for directors, more scientific information relative to the duties, qualifications, and responsibilities of directors, as a basis for the construction of such training programs.

The aims, purposes, and means of direction are far from clear-cut in this special field. Directors as well as workers in more academic fields often discuss the work in terms not assigned definite meanings, nor uniformly interpreted. There is difference of opinion regarding problems of the direction of vocational education. Teacher training departments and institutions of learning are found offering courses and curricula, with little recognition of the fact that their output must be specially designed. It is believed that the facts and combined opinions here made available, can serve in some measure to give to this special field the trend toward definite preparation that has begun to be evident in the training programs for other professions.

The individual conference and questionnaire plans were employed in making the study. Conferences were arranged with directors and supervisors to obtain a list of duties, necessary traits, qualifications, and training needed, and other information necessary in making the investigation. Seven rating scales were examined to secure a list of traits in the part of the study relating to the trait analysis. A thorough study was then made of the literature on direction of vocational education.

From the results of interviews with driectors, examination of rating scales, and the survey of the special literature, a questionnaire was formulated and sent to all state directors of vocational education, state supervisors of trades and industries, and to directors of vocational education in all cities of population of thirty thousand and over.[1]

Of the 191 directors to whom questionnaires were sent, 74.8 per cent filled in the questionnaire blank and returned it, or answered the inquiry by letter.

The summarized statements here presented, represent the combined judgments of one hundred directors of vocational education, and of the directors and supervisors who were interviewed. Inasmuch as these pages cannot contain a detailed account of the statements of those participating in the study, an attempt has been made to condense the data and to offer it in readable form. These statements present not only conditions as they exist at the present time, but the concensus of opinion as to what should be done to improve the present means and procedures in the direction of vocational education.

An attempt is made to present concretely the problems and procedures of directors of vocational education. The problems are organized into related groups, the underlying principles are summarized, and methods of procedure are indicated. No attempt is made at a detailed discussion of the problems. A separate volume might be written on almost any one of the sub-topics.

It is not expected that any review of principles and

[1]Many readers of the magazine cooperated in this study, either through individual conferences or by filling in questionnaire blanks, and grateful acknowledgment is made for that splendid cooperation.

practices in the direction of vocational education can present to the reader a composite plan which may be translated bodily into any system. In such a brief review it is left to the reader to determine what to him is of direct and personal import. The greatest value in these statements lies in the fact that they may stimulate the reader who critically analyzes them to consider the different phases of his own work in the light of the experience of others.

Since the direction of vocational education implies supervision also, the term direction—for purpose of this report—will mean both the direction and supervision of vocational education. By vocational education is meant the three divisions which have been recognized by the passage of the Smith-Hughes Act of Congress,[2] namely, (1) all day vocational classes; (2) part time classes; and (3) evening vocational classes.

Most of these one hundred directors have the responsibility of all three of these divisions of vocational work. However, in some cases it was found that separate persons were responsible for these activities.

The problems of direction as they relate to vocational education will be presented under four main headings as follows: (1) The Director as an Executive; (2) The Director as an Organizer; (3) Problems of Professional Relationships; and (4) The Training and Personality of Directors. The first of these items only, will be treated in this article. The remaining items will be presented in two later issues.

I. The Director as an Executive

This discussion concerns itself with an analysis of executive problems which will be presented under the following headings: 1, Conferences with Teachers; 2, Observations and Inspection; 3, Visitation; 4, Teachers' Meetings; 5, Illustrative Teaching; 6, Guidance and Counselling; 7, Rating Teachers; 8, Rating Own Supervision; 9, Teachers' Records; 10, Reports, 11, Purchasing and Distribution; 12, Records; 13, Inventories.

1. *Conferences with Teachers.* One means of improving teachers in service is through individual and group conferences. The director should arrange to have—at times convenient to the teacher—individual conferences for the purpose of giving helpful suggestions and constructive criticism. At these meetings there should be a free discussion between the teacher and director. The basis for these discussions may be points noted by the director in his visits, or there may be topics which the teacher has in mind, concerning his individual work, which he cares to discuss with the director. No definite schedule should be made for these conferences and the teacher should not always feel that the conference is obligatory on his part. Such conferences will be most successful when they arise from the needs of teachers. In these conferences, real, constructive help must be given. Fault finding conferences alone will accomplish little. They must be constructive, and should analyze conditions and difficulties with teachers. They should be based upon needs that have been observed or felt, and should either point out better ways of, or lead to sound thinking about, shop and classroom procedures. The teacher should go away with a feeling of having some mastery over his difficulty.

Very often trade teachers are not able to analyze their material for the best results in teaching. This is especially true if the teacher is a practical tradesman, with little or no pedagogical training. The tradesman sees his trade as a whole. The director must be able through conferences, to give him such instruction in trade analysis as will asist him in analyzing his trade, in arranging the component parts into an instructional order, and in the organization of this and related materials. Having done this, the director must then be able to give him such instruction in ways and means of "putting over" instructional matter to his pupils as will be of real help to him.

Some of the very best trade teachers are practical tradesmen with little special preparation, who have had a short period of intensive training in trade analysis.

2. *Observation and Inspection.* The director should make frequent visits to the classrooms and shops for the purpose of observation and inspection, to determine the efficiency of teaching done. But the director's responsibility does not stop here. Inspection and observation must always be accompanied by a friendly attitude, constructive help, and even practical demonstration.

In order that the work may be most helpful and constructive, the director should have formulated before going to class, a set of tentative standards for judging the quality of this particular instruction.

"Present standards for judging the quality of instruction are highly subjective. No two supervisors agree upon the quality of teaching observed. In the first place there is little agreement upon what constitutes good teaching. Secondly, present standards, when applied by different observers, to classroom instruction, reveal extreme variation in judgment. By actual experimentation, fifteen principles observing the same recitation, gave as many different opinions of the teaching as there were principals. Uniformity of judgment may be secured (1) through a summarization of what constitutes good teaching, (2) through a definition of elements in terms of definite, observable, objective, teacher and pupil activities."[3]

There are two types of standards needed: (1) General standards, or items applicable to teaching in general; and (2) special standards, or items applicable to a particular shop or classroom subject.

There is opportunity for making a worthwhile contribution to the special field of vocational education by formulating a set of special standards for the various shop and classroom subjects. These should be based on concrete, objective, observable items, resulting from analyses.

3. *Visitation.* Closely associated with the topic just discussed is the matter of visitation and intervisitation. The director should make frequent visits to the classrooms and shops. He need not have a definite schedule, which he follows, in making these visits. He can better judge the quality of teaching done, and more intelligently make suggestions for improvement, if the teacher does not know when he is coming. If the proper relationship and feeling have been established between the director and teacher, no embarrassment will result from unexpected visits.

Preferably the director should see a whole recitation at a time. When he has to enter the classroom or shop after the beginning of the recitation, he should enter in such a manner as to attract as little attention as possible. The director should not become the center of attraction as soon as he enters the room. When he finds it necessary to leave the room before the end of the period, he should also withdraw in such a manner as to attract as little attention as possible.

It should be made possible for teachers to visit other schools and other classes to observe the work of other teachers. This may be a very helpful device for the improvement of instruction.

4. *Illustrative Teaching.* One of the effective ways by which the quality and standards of teaching may be raised is through the observation and demonstration lesson. At convenient times the director should arrange a period at which all teachers may come together to ob-

[2] Senate Bill 703, 1917

[3] Barr, A. S.—"Standards for the improvement of Instruction," Edwards Brothers, 1924, p. 3.

serve the presentation of a lesson, and afterward to discuss the presentation of this lesson in a constructive manner. The director may teach this lesson or it may be taught by one of the teachers. The director should know the fundamental principles of teaching as they relate to the subjects being taught under his direction, but it is not necessary, neither is it expected that he know the subject matter necessary to teach all of these special subjects.

The chief purpose of the demonstration lesson should be to exemplify the use of sound method, show what devices are effective, and to exhibit good teaching technique. Demonstration teaching may also be carried on for the purpose of experimentation.

After the lesson is completed, the director should arrange to have a meeting at which time a critical discussion of the lesson should take place. Observation of a class with nothing definite to look for and with no discussion following it is of little value.

5. *Teachers' Meetings.* One of the best means of improving teachers in service is through teachers' meetings. However, if great care is not exercised in the organization and carrying on of these meetings, not only will there be a failure as to the results to be attained, but there will be created in the teacher a bad attitude toward the meetings. Precaution must be taken in order not to make the meetings dull, routine affairs without any purpose or end in view. There are several types of teachers' meetings that are harmful and certain to fail to produce any good results. Five of these are discussed by Cubberley, under the general topic of "Objectionable Types of Meetings." They are characterized as follows: "(1) The Bulletin Board Type; (2) The Grievance Day Type; (3) The Grumbling Type; (4) The Lecture by the Principal Type; (5) The Routine Business Type."[4]

The names of these are self explanatory and the successful director will do well to eliminate these types of meetings.

If teachers' meetings are conducted properly, good results may be expected. The topic to be discussed should be a live, pertinent topic, relating to the work to be done, and one in which all the teachers are interested. Copies of the topic or briefs should usually be mailed to the teachers a few days in advance of the meeting, if possible, in order to obtain thoughtful reaction on the part of teachers. Provision should be made for expression from each teacher after the topic has been presented. The director or person who has charge of the meeting should have a thorough grasp of the subject in order to present it in the most effective way. These meetings may also be held for the purpose of giving instructions as to plans and policies concerning the course of study, work to be done, and for the purpose of constructive criticism. New phases of work to be attempted and reports on national or state conventions attended by the director or teachers may be discussed at these meetings.

In no case should there be held a meeting where there is no definite aim for it. These meetings should never be allowed to drift into aimless discussions. They should not be used for routine purposes that can be disposed of otherwise.

6. *Guidance and Counselling.* No detailed statement of the director's responsibility as a counselor, placement officer, or coordinator, will be attempted here. In large systems this work will be in charge of the vocational guidance director. In small systems the director of vocational education may be directly responsible for these activities. But, it would require a large volume to discuss the many problems connected with this phase of the work. The director should through the training of his teachers, through cooperation with others in the system, and through contacts with students, render any service possible to promote this work.

Of course the nature and extent of the provisions made for guidance work will necessarily vary with the needs of the pupils and the organization of the all day school, part time school, or evening school in question. The most comprehensive guidance programs in 143 large and small cities, which are investigated by Dr. A. H. Edgerton, were found to include several or all of the following provisions: "(a) Providing initial interviews and conferences; (b) following up and helping to adjust young people; (c) arranging group or class meetings for studies about occupations; (d) assisting teachers of English, social science, physical science, health education, practical arts, and vocational courses in imparting occupational information; (e) cooperating with heads of departments and teachers in making courses of study and in keeping cumulative records; (f) cooperating with working permit officials, visiting teachers and other agencies; (g) cooperating with placement officers, coordinators, and other allied departments and organizations."[5]

The investigation also revealed that counselors for each level of learning should be made sufficiently free from classroom teaching, routine tasks, and disciplinary problems, to assume direct responsibility for these important counseling problems.

7. *Rating Teachers.* In the past much discussion relative to the importance or the non-importance of rating teachers, has been carried on. Caution in making the scale, applying it and in interpreting the results is necessary. There is a noticeable lack of agreement among educators as to the advisability of using rating scales. It has been noted that practically all discussion by people opposed to a rating scheme, centers around the fact that teachers are unjustly dismissed or demoted by the use of some rating scheme.

Educators, more and more, are coming to shift emphasis from the use of rating scales as devices for determining recommendation as to salary and promotion, toward the use of them as devices for the improvement of teachers in service. This shift in emphasis is reflected in much of our current educational literature. The following excerpt which indicates the trend of thought is taken from an article by Rugg:

"If a rating scheme is to be truly helpful, its chief element must be self improvement through self rating. Improvement of teachers in service rests directly upon the initial step of self criticism. It is conceivable that this could be stimulated by the personal exhortation of the principal. It rarely is however. It can be stimulated from within more helpfully and continuously—provided objective impersonal schemes can be developed, by which teachers can be made critically conscious of their strength and weakness. Thus rating schemes to the present time have revealed an important defect in that they were nearly always an administrative scheme superimposed from above."

A number of schemes for rating teachers have been devised, but nearly all of them have been constructed for the rating of teachers of general subjects, and are not adapted to the rating of teachers of special subjects. If properly constructed, used, and interpreted, the rating scale has possibilities of contributing much to the improvement of teachers in service. It is suggested that the teachers be given opportunity to help construct the scale with which they are to be rated, and by which they are

[4]Cubberley, E. P.—"The Principal and His School." Houghton-Mifflin Co., 1923. pp. 314-15.

[5]Edgerton, A. H.—Vocational and Educational Counseling, Macmillan. Chap. VII.

to rate themselves. The specific scale to be used should either be cooperatively determined by all concerned or chosen from those in existence upon the basis of examination and discussion by the entire group of teachers.

The teacher should be made to continually feel that the rating scale is a device for self improvement. By self rating and self analysis, and by having objective standards for success, the teacher may be expected to strengthen himself.

8. *Rating Own Supervision.* Just as the director rates the efficiency of his teachers, so should he rate the efficiency and quality of his own work. This problem resolves itself into two definite steps or divisions: (1) setting up of fundamental principles, and (2) organizing of a program or procedure based on these principles. The principles involved in measuring supervisory efficiency must necessarily be the same in all cases where supervision is carried on. The following principles are quoted from Nutt's book on the supervision of instruction. (Only a brief statement is given here but the director is urged to read the entire chapter referred to in the foot note.) Principle One. "Set up definite attainable goals or outcomes that are to be realized through supervisory activities." Principle Two. "Designate definite types of objective data that may be taken as evidence of supervisory efficiency." Principle Three. "Secure designated types of objective data from as many accurate and reliable sources as possible." Principle Four. "Study the supervision performances themselves as evidences of the efficiency of supervision."[6]

Another type of evidence that should be considered, is the attainment of pupils being taught under the supervision of the director.

By setting up such objective standards and principles—as have been indicated—and by referring to his records of teachers' meetings, visitations, conferences, rating of teachers and pupils, and by noting the successes and failures of the past, the director should be able to judge as to the efficiency of his own work.

9. *Teachers' Records.* The director will desire to have teachers keep a few simple but useful records. Records and record forms should be used only to the extent to which they simplify, make easier, and make more efficient the work of teachers and pupils.

The useless detail work of over-systematizing adds to the burden of both teachers and students. In some schools so much "paper work" is demanded of instructors that the regular work of instruction is greatly slighted. Only those forms which are necessary should be used.

10. *Reports.* The director usually makes certain reports to the superintendent or to other persons. Much of the routine work should be done by clerks in the office of the director. Some directors devote too much time to reports and other clerical work, neglecting the more important duties of actually supervising and improving the quality of instruction.

11. *Purchasing and Distribution.* The method used by various schools for the purchasing and distribution of supplies and materials varies widely. In large schools or large cities, where a purchasing agent is provided, this matter is greatly facilitated. In smaller systems much of the work is necessarily left for the director to do. At any rate, whatever the situation, a systematic method should be formulated for purchasing and distributing supplies, in an economical and efficient manner.

Instructors should be provided with requisition forms. Each requisition should be made out in duplicate, the instructor retaining one copy. Invoices for materials should be rendered in duplicate, so that the instructor may have a record of the material purchased. After checking the material received, one copy of the invoice should be approved or corrected and returned to the director or other person designated as the purchasing agent. Where the system is large enough, and a separate person is employed as the purchasing agent, requisitions and invoices should be made out in triplicate, so that all three persons involved in the purchase may have copies of both the requisition and the invoice.

Where the school or system of schools is large enough the material should be stored in a stock room. When a student needs material, the instructor makes out in duplicate a requistion on the stock room for the material, retaining one copy of the requistion and sending one copy to the stock room. On the requistion should be a place for the job number. Such a system as this will provide for economy of time, accuracy in checking, and a record of all materials purchased and distributed. In a large system, materials may be purchased in large quantities. The system of handling the purchasing and distribution of supplies will depend—to a great extent—upon the size of the school or school system and the type of work being offered.

12. *Records.* The office of the director should be conducted in a business-like manner. Some standard system of filing should be adopted, and records kept in an organized way. Organization and system prevent waste of time and promote more efficient work. Some standard form should be made, and printed supplies of such forms should be available, for all items necessitating recording. Reports on students by teachers should be made on some standard form and filed in the office of the director for ready reference. Records should be kept of the purchase and distribution of all supplies and equipment. There should be stenographic records of all teachers' meetings. Bibliographies of books, magazines, and magazine articles should be filed. All letters and carbon copies of answers to them should be filed. It is evident that in a large system, adequate office help must be supplied the director. It is imperative that he be relieved of the detailed office work. His time should be taken up with that more important work of actually directing and supervising, of improving the efficiency of his teachers, and of stimulating and promoting the work they are doing.

13. *Inventories.* At periodical times during the year, at least once each year, the director will wish to have an inventory of all stock, material, supplies, tools, and equipment. In some cases it is possible to keep a perpetual inventory. When the material and class work lend themselves to such an inventory, it is probably the most satisfactory.

In communities where separate organization and control of vocational education exists, the matter of inventories will be directly in the hands of the director, or of persons designated by him.

In communities where both vocational education and general education are administered by one and the same board, the responsibility of inventories may be with the superintendent, or persons designated by the board of education, as the business manager, or property custodian.

Inventories should always be made at the close of the school year, and may be made at the end of each term or semester. Copies of inventories should be made available to the director, supervisors, and teachers at the opening of the school year. This will provide an opportunity for those who are responsible for the equipment and materials, to check the list and make a statement to the administration of any discrepancies that have been found in the inventory record.

(To be continued)

[6]Nutt, H. W.—Supervision of Instruction, Houghton-Mifflin Co., 1920, Ch. XVI, pp. 231-65.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

THE BOY'S FIRST PIECE

Nearly everything depends upon the boy's first piece of work to be done in the shop. The teacher who hasn't learned this, still has an important lesson due him. For the boy's whole state of mind, and his attitude toward all the remainder of the work, will be largely determined by the way the first piece progresses, turns out, and pleases him.

How esential it is, therefore, that the boy get the proper notion at the very start of what it's all about, "what it's for," how it works, what it costs, etc.! It is just as important that he get a proper start on the mechanical work at the very beginning. Delays are disastrous. A half-hour spent in idleness, waiting for material, instruction, or what not is a breeder of disgust and of unnumbered future half hours of idleness.

The little difficulties along the way also deserve the most cautious attention of the instructor. To be on hand just at the moment where catastrophe impends, when patience is almost exhausted, and when a certain tool or a certain operation just *will not* respond to the efforts of an impatient boy—to be on hand at such a time is to save the day and sometimes the years in the future career of such a boy.

Many of a teacher's great opportunities come at such inconspicuous times, in such apparently trivial circumstances, and in such rather commonplace exigencies.

The first little piece of work a boy does in the shop, if properly done under proper teaching, is the first great long lap on the journey toward success. If it is improperly done under poor or indifferent instruction, it is a whole long journey of failure completed. The first piece may wreck or ruin—it depends entirely upon the teacher.

AS A MAN THINKETH

Any teaching that does not result in better, clearer thinking is either poor teaching, or no teaching at all. Any educational program worthy of the name is primarily for the purpose of organizing the thinking and increasing the thought power of those who go to school. The pursuit of truth is the purpose of all science, philosophy, and education. The instrument of this pursuit is thinking.

The greatest need in the world now is the need for clear, sane, constructive thinking. The tragedies of the world, the partial breakdown of law and government, and the injustices and maladjustments of the modern industrial world are all largely due to crooked, distorted thinking. There are other factors in all these matters, let it be freely granted, but in the final analysis, wrong and inaccurate thinking were to blame.

Straight thinking will destroy prejudice, rout error, correct evils and maladjustments, and bring justice and harmony into the affairs and relations of men.

The industrial arts work is peculiarly adapted to the teaching of accurate, constructive thinking. One of the difficulties with most thinking is that it cannot be brought down to an objective, practical basis. Shop-work, when properly done, requires thinking both in the abstract and theoretical sense, and also in the objective and practical sense of application to specific, material problems. Every shop worker has at hand the essential test and proof of all of his thinking and his work.

Much of the difficulty of the shop courses of the past, however, has been due to the fact that all the thinking has been done by the teacher, or the textbook, or blueprint maker, and none of it left for the pupil in the shop to do. Drill, dictation, blueprints and specification, have destroyed many an opportunity to *think*.

It is still true that "as a man thinketh, so is he." It is vastly important, therefore, that every pupil be given the means, the methods, and the opportunity of accurate, consistent, and unprejudiced thinking. Then he should be encouraged and prompted in every possible way to have the courage and the moral stamina to stand patiently and resolutely for the conclusions to which his straight thinking have led him.

EDUCATIONAL WINDOW SHOPPING

These is some danger that in many of the tryout, part-time, and continuation shop courses, the student may simply stand outside and look in. The reasons may be the same that prompt the window shoppers to stand outside and look in—idle curiosity, lack of ability or the "wherewith" to acquire the attractive specimens offered in the windows or the show cases, or the lack of adaptability either of the article offered or the individual doing the shopping.

To be sure, the window shopping may induce the shopper to step inside and to make further inquiry concerning the cost, the fit, etc., but this only means that the view from the outside looking in doesn't get one very far into the real heart of things or the secret of their values. So it is with the preliminary courses given where the pupil spends so many weeks in each of so many different shops. It has its general educational values; it may afford some pleasure and satisfy some idle curiosity; and it may arouse a desire to investigate more fully concerning any one or all of the offerings. However, as a means of ascertaining information and skill in the actual trade of which the sample is the showcase, the tryout courses can have but little significance. They really do not try out except in the most fragmentary and doubtful sort of way, except in cases where definite decisions are in the making. In such cases, the tryout courses and shops may make some contributions. It is not safe, however, to place too great store by such efforts. This does not in any way reduce the value of such shops and courses. They are still good for general educational purposes and they add to certain modicum of trade atmosphere, attitude and knowledge.

VOCATIONAL TRAINING FROM A WORLD VIEWPOINT

The readiness with which the trade school idea was accepted in this country, must be regarded as an epoch in the American system of popular education. The changes in the industrial field, with the transition from individual work to mass production and the decline of the apprentice system may have accelerated the idea, but be it said to the credit of the American educator that he came more than half way to meet the newer situation.

It has frequently been said that the United States holds a prominent place in the world markets, only because it was the greatest producer of raw materials, that it unwisely sold these raw materials to the countries of Europe and then bought back the finished product. But, the thought has always been coupled with the further statement that the American manufacturer could not compete with the skilled labor of the old world.

The European mechanic, it was held, was more skilful and worked for less pay, and if the product of the American factory found recognition in world markets it was due to the fact that production was accomplished through ingenious labor saving machinery. It was also contended that all American industries involving the element of science and a high order of mechanical skill had to give way to the superior forces of Europe. All this, of course, was before the world war.

And while it must be conceded that, in the main, the statement above advanced was true, it must also be noted that a change has taken place. This country has learned a few things in the utilization of its raw materials. While it is as anxious to sell them now as it was before the world war, it now sells many of them partially prepared in the direction of the finished product. At any rate, the export articles now represent a larger proportion of labor put in them than was the case years ago.

But, what about skilled labor, that labor which must compete with the skilled labor of foreign countries? Are we training our industrial army to meet the newer conditions that have arisen in the world markets?

The answer is best given by recalling the situation that existed in Europe before the world war and that exists there now. Germany was leading all other countries in vocational training. Her factory products were not only gaining recognition because of price, but also because of their finished workmanship.

The vocational schools of Germany were not only training for the skilled industries, but were infusing beauty and good design, wherever this was permissible into the article itself. The variety and scope of these schools became the marvel of their time, and served as an inspiration to our country.

The French have always manifested a genius for the production of the more luxurious articles of life. Certain industries have been fostered in villages and towns for many decades and mechanical skill has transcended in families from generation to generation. Their handwork has defied the competition of machine work.

Now that the clouds of war have cleared away it develops that Germany is fostering her vocational schools with even greater zest and is holding steadfastly to the thought that her rejuvenation and rehabilitation must come through industrial efficiency which implies the vocational training of its youth. France, too, has lost none of its deftness in its traditional industries. The world continues to buy her artistic fineries.

The phenomena which presents itself in Europe today is that England, which does not foster industrial training with anything like thoroughness, is suffering from the evil of unemployment while Germany and France are well employed. While there are those who attribute England's plight to a restless labor constituency, to a lack of enterprise on the part of British capital, and to the country's free trade policy, there are many more who assign the troubles to the lack of a trained constituency of skilled artisans.

But, coming back to our own country we find that the inauguration of the vocational era is both timely and expedient. While America can never permit a lower standard of living as applied to its laboring classes, and hence will not compete against a cheaper labor market, it can assert a competitive attitude on many articles of production.

This competitive attitude will find its strength in the utilization of raw materials which are peculiar to the country, in organization ability as applied to quantity production, and last but not least in the skill and fidelity of the worker.

Every country has the faculty to excel in certain articles of production over all other countries, and to create a world market for them, but there is no reason to doubt that with the constant progress made in the industrial arts of our own country that we cannot utilize our wonderful natural resources by weaving and welding them into finished products.

While it is not within the scope of this discussion to dwell upon the prospective phases of our country's participation in world trade, it remains to be said that if we are to secure our share in that trade, we must stand ready to compete both in the matter of price and quality, and further that actual skill in workmanship will prove an important factor to be dealt with.

The day will soon pass when our volume of foreign trade can rely upon the export of raw materials. We shall then be obliged to turn to the competitive commodities in which the element of mechanical skill and science will turn the scales of international bargaining. American brains, ingenuity, and industry must be able to compete with European skill, economy and diligence. The vocational training now so enthusiastically fostered will ultimately assert its value as a factor in international trade relations.

Little Arguments On Great Principles

Tan and Art

"You are looking fine today, Mr. Try Square," remarked the optimistic Art teacher. "I think your summer vacation must have been well spent out in the open to have given you that good, rich, beautiful tan."

"Yes, Mr. Frills," replied the energetic Manual Training teacher. "I see you have a ruddy complexion, too. After all, I guess you artists have a legitimate field of study. Outside appearances are sometimes deceitful, but even outside appearances have their indications. Yes! I have been doing a variety of outdoor work this summer and I have enjoyed every minute of it.

"By the way, Mr. Frills, my class in wood-work has just completed the first exercise, and I wish you would tell us what finish to put on those book racks. All I am asking you to do is to get a little art into the things by telling the boys what color will look best on them. You artists have an eye for that sort of thing, you know. A little art on the outside may make those racks show up to some advantage."

"You do me great honor, Mr. Try Square," said Frills with a smile. "You not only acknowledge that I have a legitimate field of study, but you allow me to exercise my ability in that field by inviting me to tell your class how they may beautify their work with a little outside finish. I take it for granted, Mr. Try Square, that your boys have designed the racks well."

"Designed the racks," snapped Try Square. "No! They did not design the racks, they made them. The racks were already designed by some one who knew more about design than either the boys or I could possibly know.

"I copied the pattern from Shop Problems and gave it to the boys without any preliminary guess work or free choice. Our list of exercises is too long, and our time is too short to waste any of it designing when I can buy a book of shop problems for a few cents. Besides, I am not teaching Art."

"Oh! I see," drawled Frills. "So you do acknowledge that the design of the book rack was art?

"Art, then, is not applied to the outside only, but is involved with the design. I am getting you clear now, I think, Mr. Try Square. What you want me to do is to make the most of a design you have copied by covering it up with artistic outside finish."

"Yes," sighed Try Square. "Just as you and I have covered up two contentious dispositions with a little artistic tan."

Industrial Arts Work in a Kansas Rural High School

C. A. Schwab, Director of Industrial Arts Work, Melvern, Kansas

What type of industrial arts work is justifiable in a rural high school? This question confronts every instructor in this field, and must be answered honestly if such work is to be effective in meeting the aims of the school, and of the shop department. The present article explains how one school in Kansas is answering the question.

The Melvern High School has an enrollment of about one hundred students, and approximately one-half of these are boys. Two years of manual-arts work is offered the boys. The school was organized five years ago in a district which contains, besides the town, about eighty square miles of farm land. When the school was organized, the local school district owned the grade school building, and leased a portion of it to the high school district. The building was inadequate and so a temporary frame building was erected to serve as a shop. The shop structure contained only one room, where the work was carried on. As a consequence, much of the wood finishing was of the sawdust type.

A year later the domestic science classes took over the shop, and an old garage was rented for the shop classes. Here the teacher and the class lived and worked, in dust and cold, and traveled morning and afternoon, more than a quarter of a mile to and from the main buildings—a pleasure not soon forgotten.

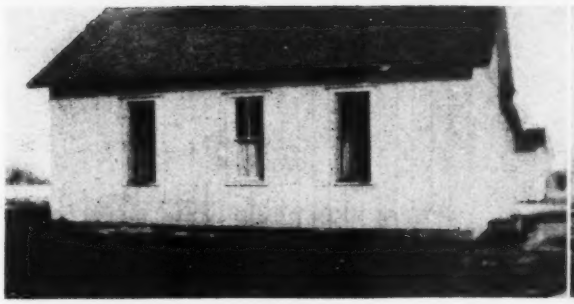
The third year brought some improvement. A three-room frame building was erected on a corner of the school grounds, and one room was set up as a bench room, another as a finishing room, and a third as a forge shop.

At present we have a $65,000 brick school building, fully equipped with a big bench room, a drawing room, a finishing room, and a tool room. We have electricity, water, toilets and showers. Our shops are located on the main floor, for the manual-arts work has passed beyond the basement stage.

A well developed course with correct aims is an important element in any industrial arts work. Tools and equipment are necessary elements, but I believe it possible with meager equipment and tools to offer a course that fully justifies itself. I have found, however, through some experience, that linking the two, produces the best results, and this is an ideal I am working for.

During our first year of service, 1921-22, our two classes did wood-working, because both groups were beginners. There were twelve boys in one class and fifteen in the other. Some finishing and some upholstery were introduced from time to time, as our regularly planned work justified it.

During the second year, 1922-23, the beginners were given bench work. During the two semesters, the second year students were given a course in general mechanics. This latter course included furniture repair, finishing and upholstering, and gas engine work. For the latter we purchased an old Ford engine which the boys overhauled, and which gave an opportunity of teaching the principles



THE FIRST SHOP.

THE PRESENT BUILDING.

of gas engine operation and repair. The boys brought in some of their own cars for minor repairs, and we handled odd jobs of various sorts which came in from the community.

During the third year, 1923-24, we had better results, in part due to our improved building and equipment, and in part to an improvement in the course for the second year class.

We have not changed the course for beginners, except that we have improved the projects in woodwork, and have had a greater variety to offer the boys. We are seeking to prevent saturating the community with taborets and other similar projects.

Our advanced course in the second year now is made up of three main divisions: (1) Gas engine work; (2) sheet metal work; (3) elementary concrete construction.

During the first year our projects are intended to be of use in the home and about the farm. The boys are permitted to select any five of the nine following projects, which are a part of the required course:

Cutting board—various designs.
Handy nail box.
Filing box.
Knife, fork and spoon tray.
Candle stick, mortised into base.
Foot stool, mortised, upholstered.
Taboret.
Book trough.
Hall tree.

In connection with the shop work, standard textbooks and various magazines and bulletins of the Department of Agriculture, etc., are used. Every boy is expected to make a drawing of each project which he makes. The drawings are inked in, but are not blueprinted.

In the second year each boy is expected to make one advanced project in woodworking.

Under the heading of gas engine work, the boys are expected to make a drawing in order to learn the names of all the important parts of a gas engine. A Ford car is disassembled as the study begins and is reassembled. Standard texts in auto mechanics are used to help in the work.

Under the heading of sheet metal work problems involving the cylinder, the cone and the prism, are undertaken. These include such practical articles as funnels, sugar scoops, handy dust pans, measuring cups, money banks, and electric toasters. General repair work of household utilities brought in by the class, is undertaken. Textbooks and magazines are used as reference works. All sheet metal projects are left with raw edges for we have no machines for this work. Some riveting is done, but usually plain soldering is used in fastening.

A brief course in harness repair is offered. It includes a brief study of leather and its uses, the use of stitching horse, hand and machine riveting. Ample material for making repairs and for cleaning harnesses is brought in by the boys.

The course in elementary concrete construction involves the making of various smaller articles. Some of the projects are: A boat anchor, foot scraper, flower tray, poultry and hog troughs, lawn pedestal, garage floor, sidewalk, hog feeding floor.

Some of the projects are colored by mixing coloring material with concrete mortar or by applying a concrete paint. Various textbooks, bulletins, and circulars are used to supplement the actual jobs.

Mechanical drawing is offered as a part of the shop course and standard textbooks are used as guides.

The shop is equipped with tools, but contains no machinery of any kind. We do not believe that it is proper to install machinery in this type of a school, unless we make an exception for a band saw. The boys use hand tools only, because they will be obliged in their home shop to depend on hand tools and will not have machine tools available.

All of our tools are kept in a tool room and are checked every day. Every boy has a check number. The checks are kept in a small cabinet in the tool room, and only the boys have access to them. A number of common tools which are generally used, are kept in the benches at all times.

All the boys enjoy the work and are getting very much out of it. Teachers of industrial arts work in large centers might doubt the possibility of motivating a course which seems to give so little opportunity for variety. We allow all the freedom of choice possible within the course. We appreciate the limitations of our equipment, etc., but we never lose sight of the fact that the course is intended for the boys, and not the boys for the course.

Vocational Work Added. Vocational work has been added to the course of study at Garretson, S. D. Under the Smith-Hughes plan, a student will spend half a day in that work and the other half in the study of mathematics and English work. All work will be divided into shop work, and crops and soils. The home project work will be an important part of the course, and each pupil will be required to select a project for which he will be held responsible.

Pageant of Workers. A pageant of workers, portraying 48 different occupations, was presented recently by vocational guidance classes of Clifton Park high school, Baltimore, Md. In the first seven scenes, each student dressed to represent the occupation chosen and carried appropriate equipment. Other scenes showed educational and health work in schools, industrial life, and art.

Trades School Plan Approved. Plans for the establishment of the Dallas (Tex.) vocational school for training in the skilled trades and crafts have been approved by the executive board of the Dallas Construction Council. The board has ordered the appointment of a committee to work out detailed plans covering the cost of the erection of the first unit of the school. This unit will be used to house the building trades, including brick-laying, plastering, tile setting, plumbing, house wiring, and cement finishing. Other related work will be added later.

A Floor Lamp

L. F. Hyatt, McKinley High School, Canton, Ohio

Frame. The frame for the lamp, shown in Fig. 1, can be purchased ready to put together, or can be made by any one who has available a method of steaming the dowel material to get the necessary curve for the legs. If the frame, as purchased, is higher than this one, it can be cut off at the top, before nailing together.

Four pieces of 7/8" rock elm dowel material, 59" long, and four pieces of slightly curved dowels for braces, 11" long, are used; two blocks of wood, 1" x 4" x 4", and one block, 5" square, are needed. The spread at the bottom of the frame is 13" from leg to leg and 20" diagonally. A 7/8" hole is bored in each corner of the blocks, tangent to the edges, as shown at *b*, Fig. 2, and a small hole is

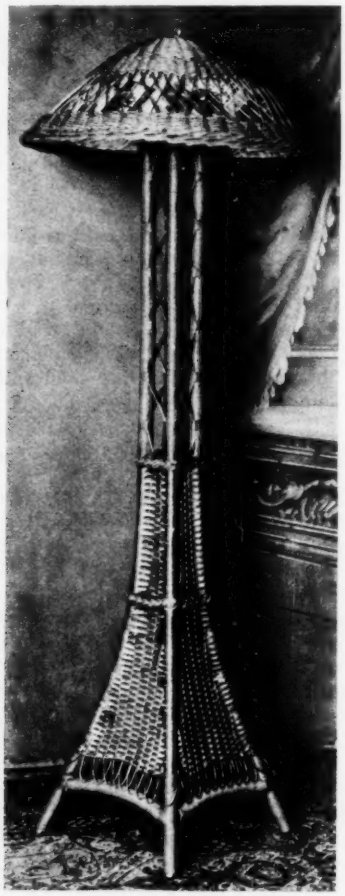


FIG. 1. FLOOR LAMP.

bored through the center of each block for the electric wiring. It is necessary to bore 3/32" holes through the dowel, for nailing, as the wood is too hard to nail otherwise. The top four-inch block is nailed even with the top edge of the dowels. The next four-inch block is 25" below this and the five-inch block is 10½" below this one. Nail on the braces 4" from the floor. See Fig. 3. The blocks should be stained the desired color before the weaving is begun.

Weaving Material Necessary. This lamp can be made of reed or fiber cord. The former must be soaked thoroughly before using. The latter is easier to handle and is more pliable. If reed is used, the lamp requires two pounds of number six, one pound of number four, a hank of winding material, and a pound of ¼" flat. If fiber cord is used, the lamp requires, besides two pounds of ¼" flat weaver, six pounds each of 4/32" weaver, and 4/32" wire staking. The fiber cord is obtainable in the natural color or in the kraft which is a grayish brown.

Weaving the Base. It is best to wind the braces and feet at the bottom first, as there will be no stakes in the way.

As will be seen, the legs cannot be wound where the braces are nailed to them, so it is necessary to cover this space by a process called strapping. See C, Fig. 2. Cut 24 pieces of the winding material about four inches long and nail six around each corner on to the braces. This makes the space on the post appear as if wound, when all is finished.

Wind the braces and the feet for about eight inches up.

A strand of the winding material is secured, as shown at *A*, Fig. 5, and the strand is used to wind the dowel when it becomes necessary to splice. This is done by winding the new strand underneath for about one inch;

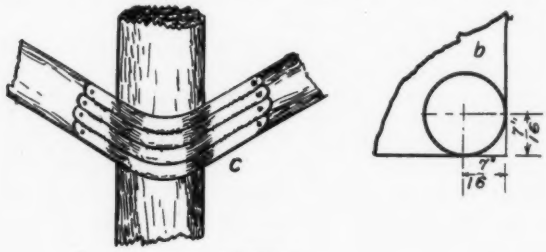


FIGURE 2.

then the old strand is twisted over, bringing the end of the old strand underneath. The new strand is used, thus winding the end of the old strand underneath, securing both ends, and making a splice that is hardly noticeable, *B*, Fig. 5. The end of the winding strand is secured as shown at *C*, Fig. 5.

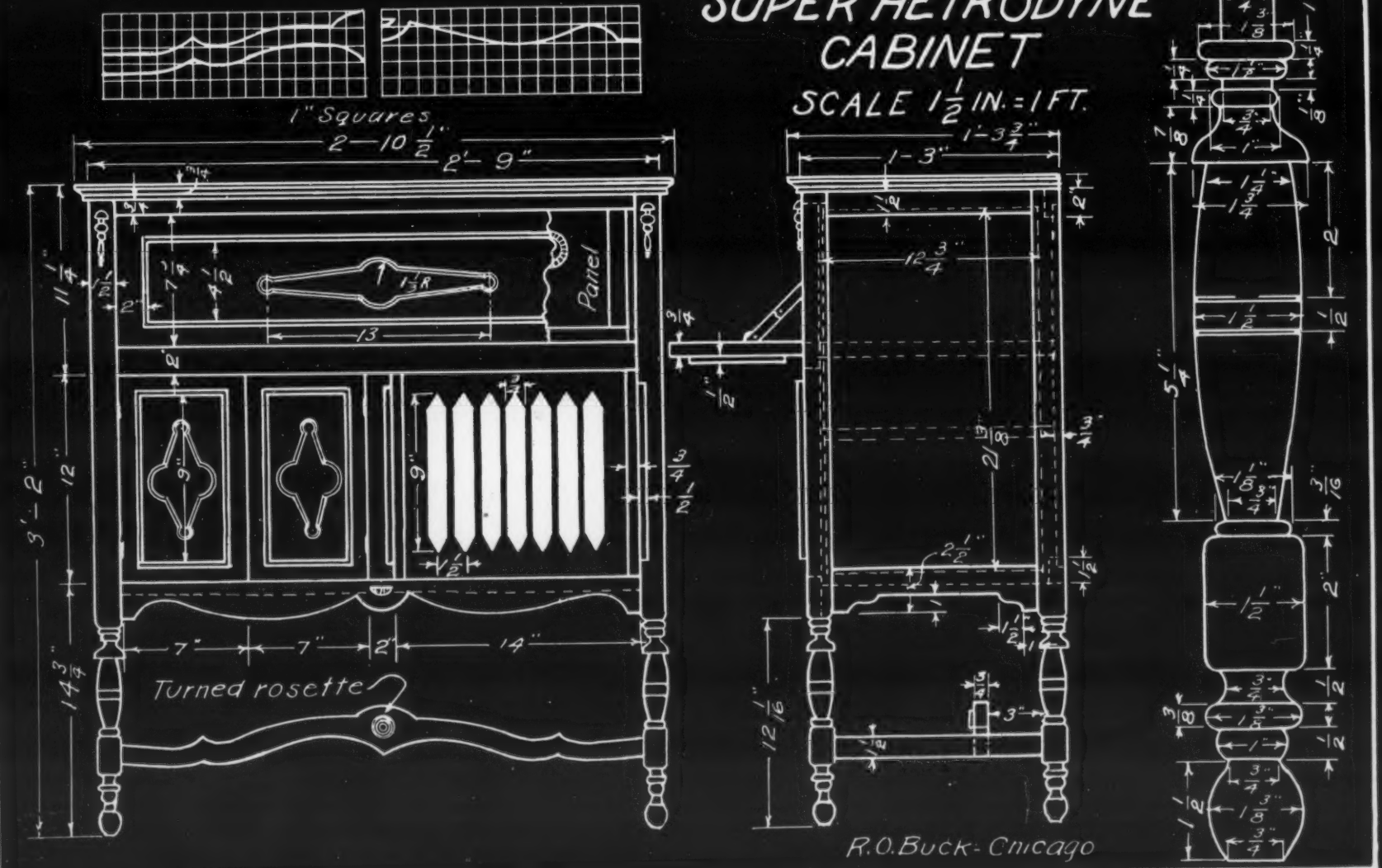
Next put in the lattice work near the top. Fig. 3. Mark each dowel 2½" down from the top block and 2½" up from the center block, and then divide the distance between into four-inch spaces. Nail the center of a six-foot strand of wire staking, or number six reed, to the under side of the top block, *a*, Fig. 3, half way between the two legs on that side. It will take perhaps two 3/8" or ½" nails to hold this in place. Then nail the right-hand strand of the six-foot piece to the place, 2½" down, *d*, Fig. 3; then carry it across and nail it at *e'* on the opposite post; then carry it back to *f* on the right post, then to *g'* on the left post, then to *h* on the right post and then to *i'* on left post. Nail the left strand at *d*, then carry it across to right post and nail at e, then nail at f', then g, h', i, and down to x. Finally carry the end up to i', and nail both ends together.

After the lattice is put in on the four sides, the posts are wound very tightly, covering each tacked place five or six times. With fiber cord the 4/32" weaver is used and with reed, the winding material. As it is almost impossible to use a strand long enough for the whole space, it will be necessary to splice several times. This should be done where it shows least.

Weaving Lower Half of Base. With a 9/64" bit, bore holes ¼" from the edge on the under side of the middle block, *b*, Fig. 3, and through the lower block, *c*, Fig. 3,

SUPER HETRODYNE CABINET

SCALE 1½ IN. = 1 FT.



Super Hetrodyne Cabinet

Ralph O. Buck

The Super Hetrodyne cabinet is intended for a seven or eight tube set, and has so compact an arrangement that all batteries, speaker, and set are completely housed. As Super Hetrodynes work most efficiently with a loop aerial, the top of the cabinet is usually devoted to that; however, an aerial of the type used with Radiola Supers may be screwed on the back of the cabinet, leaving the top free.

The drawing shows one set of doors open so the grill at the front of the speaker is exposed. The cabinet at the left is used for the storage and "B" batteries. The speaker horn may be built or purchased from a phonograph supply house, at moderate cost.

The raised moulding and panels on the doors are merely suggestive, and may be varied to suit individual tastes, but something should be used to relieve the flat surfaces.

Allowance is made in the bill of materials for all tenons. Mortise-and-tenon joints are used throughout, except for the turned legs, which are dowelled into the upper square portion.

Bill of Materials for the Super Hetrodyne Cabinet

1—Top ¾"x1' 3¾"x2' 10½". Molding on three edges.
4—Legs 1½"x1½"x2' 1⅛".
4—Legs 1¾"x1¾"x12⅛". Turned.
2—Rails ¾"x1½"x2' 7½" (¾" tenon on each end).
2—Rails ¾"x2"x2' 7½" (¾" tenon on each end).
1—Rail ¾"x2¼"x2' 7½" (¾" tenon on each end).
1—Rail ¾"x3¾"x2' 7½" (¾" tenon on each end).
1—Lid ¾"x7¾"x2' 6". With raised panel and moulding.
4—Doors ¾"x7"x12". With raised panel and moulding.
2—Side panels ⅜"x12⅜"x1' 9⅜".
4—Side rails ¾"x1½"x12¾".
2—Side rails ¾"x2½"x12¾". Formed.
2—Bottoms ¾"x1½"x2' 6¼".
1—Center partition ¾"x1' 1½"x1' 1¼".
1—Shelf ¾"x2' 6¾"x1' 9¼".
1—Speaker grill ⅜"x12"x14". Jig or scroll sawed.
4—Door stops ¼"x½"x12".
4—Door stops ¼"x½"x14".
2—Panel cleats ¾"x1¼"x7".
1—Panel cleats ¾"x1'x1' 6".
2—Lid stops ¾"x¾"x7¾".

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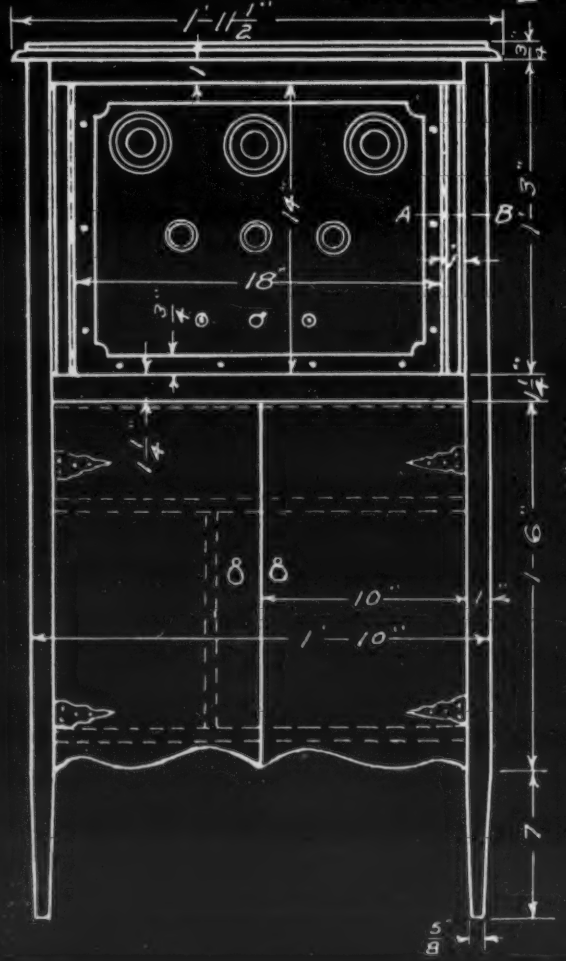
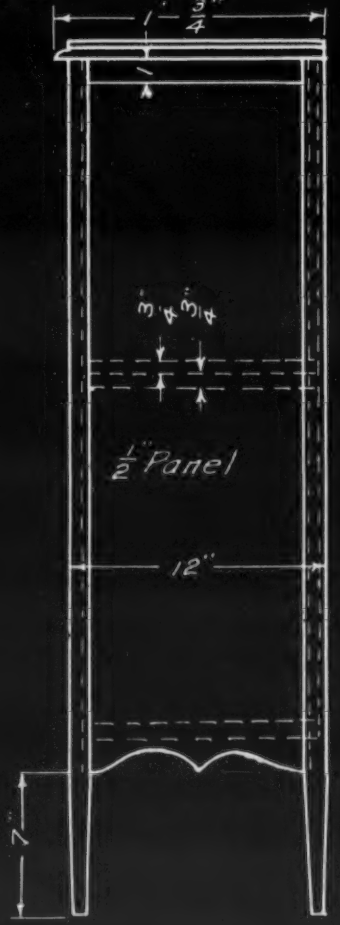
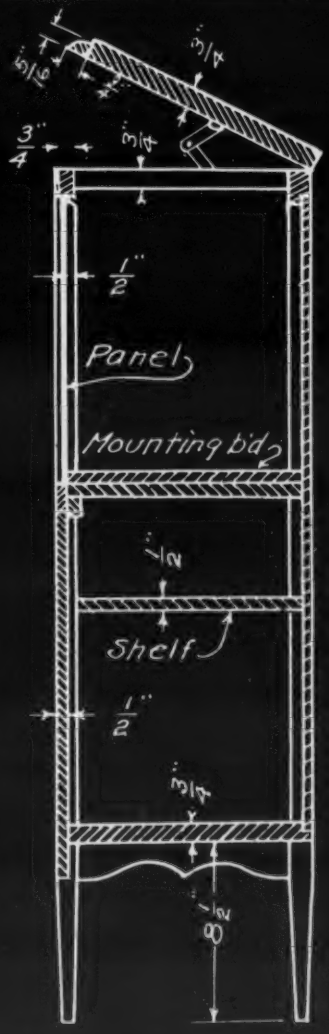
VERTICAL CABINET

SCALE 1½ IN.=1FT.







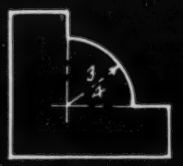
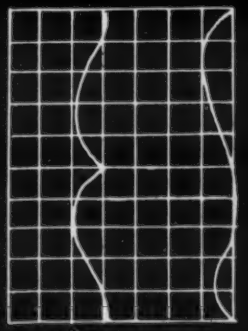
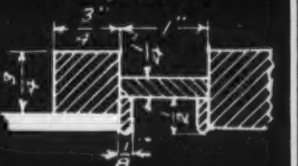


FIG. 1



1" Squares



Detail at A-B

R.O. Buck-Chicago

Vertical Cabinet

Ralph O. Buck

The vertical type cabinet has the advantage of taking very little floor space and is easy to construct. Veneered panel stock may be used for the sides, doors, back, and lid; with solid legs, rails, etc., to give the project strength and rigidity. The cabinet is roomy and will house a set of any size, though the arrangement is particularly suited to the neutrodyne receiver.

As the cabinet is so plain, ornamental hinges, pulls and panel are suggested to relieve the straight lines. Tapered legs give a pleasing effect, are easily made, and harmonize well with the rest of the cabinet.

The panel may be engraved with the border shown, very easily. Figure one shows a templet made of sheet aluminum which should be clamped to the corners to cut the corner arcs and prevent running the line further than intended. The engraving can be done with a stiff, sharp knife point. White or ivory enamel, or aluminum paint, should be run into the engraved line to make it effective.

The detail at "A" - "B" shows the little side panels that help to give balance to the design. If a larger panel is desired, this may be omitted.

The moulding may be made quarter round with a hand plane, then tacked and glued around the edge of the lid as shown.

Bill of Materials for the Vertical Cabinet

1—Top ¾"x1'x1' 10¾". With moulding.
4—Legs 1"x1"x3' 5¼". Tapered at bottom.
2—Side panels ½"x10¾"x2' 9⅝".
2—Doors ½"x10"x1' 6".
1—Back ¼"x1' 8¾"x2' 6½".
1—Rail ¾"x1"x1' 8¾".
1—Rail ½"x1¼"x1' 8¾".
1—Back rail ¾"x1¾"x1' 8¾".
1—Panel ¼"x1"x14".
2—Strips ⅛"x½"x14".
2—Panel braces ¼"x¾"x14".
1—Mounting board ¾"x11½"x18".
1—Bottom ¾"x11¼"x1' 8½".
1—Bottom ¾"x11½"x1' 8½".
1—Shelf ½"x10¾"x1' 8".
1—Partition ½"x10"x10¾".

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for the stakes for the weaving. Bore two holes equally spaced on three sides and three on the fourth side, as there must be an uneven number of stakes. The holes are not bored entirely through block b. Insert and glue the stakes in these holes, 32″ long. See *o*, Fig. 3.

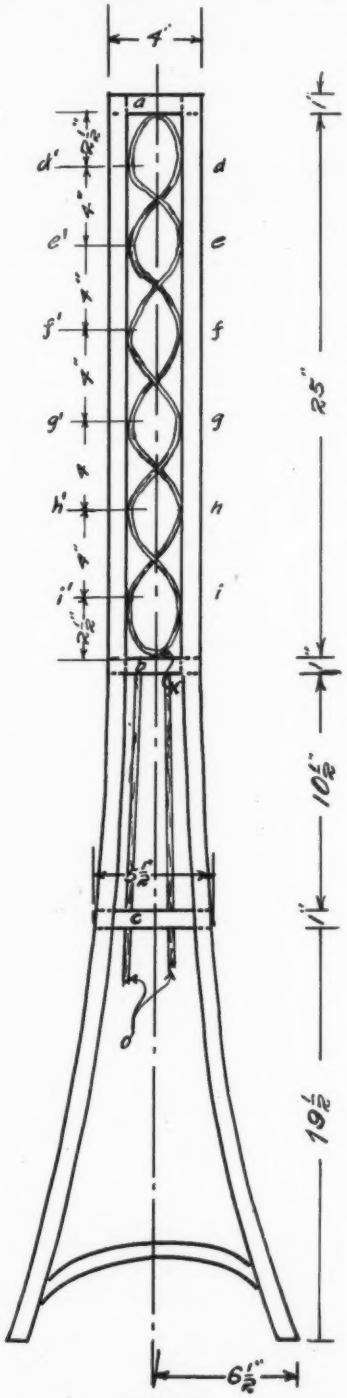


FIGURE 3.

Weave by inserting a flat weaver behind a post and go from left to right in front of a stake and back of one, around the base. When the weaver comes *on top* of the corner post, go on with the weaving; but when it comes *under* the post, carry it once around the post before proceeding. Weave to the five-inch block, then begin below the block in the same manner, after having tacked two stakes, 20″ long, on each side of posts close to the block. These eight stakes are woven in with the posts eight times and then they are used in the weaving as the spaces are becoming too wide. Weave around six times and tack another stake, 15″ long, on each side of the posts. Wrap these in with the post nine times and then use in the weaving. Weave six times around and tack on eight more stakes, 11″ long. Wrap these in with the posts nine times and then use them in the weaving. Weave six times and tack on the last eight stakes, 7″ long. These are wrapped in seven times and used twice in the weaving.

Before the stakes are finished at the bottom a two-rod arrow is woven in. See Fig. 4. To make this, use two round weavers twice the distance around the base at this

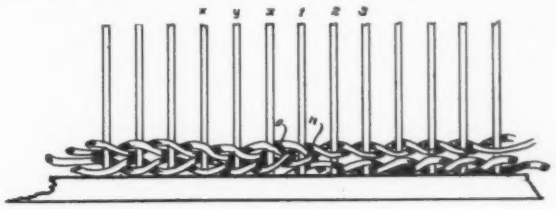


FIGURE 4.

point, plus eight inches. Start the two weavers behind two consecutive stakes. Carry them around together, crossing them between each stake, keeping the one which comes to the outside on top, and the one which goes to the inside underneath. When once around, weave around the second time by reversing this, keeping the weaver which comes to the outside underneath the weaver which goes to the inside. This makes an arrow effect. It is locked as shown in Fig. 4. Carry strand on the left in front of z and insert at o, and carry strand on the right in front of 1 and insert at n. The stakes are finished off by inserting each stake with the second stake to the right, making the lace effect, as shown in the picture. Each

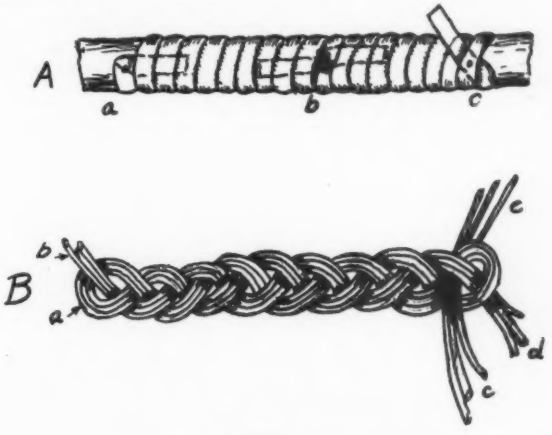


FIGURE 5.

stake is nailed to the brace where the strands cross. A three-ply braid is nailed around each block. The braid can be made as shown in B, Fig. 4. The weaving of a lamp shade will offer no difficulties to the person who has done any basketry, as the weaves are all simple and are among the most common weaves used in basket weaving. If a frame is constructed over which to weave the shade, it will simplify the shaping of it.

Three strands of weaver are taken and folded, allowing the same amount each side of the fold *A*. Three

strands are inserted as shown at *B*, and the braiding is made long enough to go around the blocks. The ends are secured by bringing the strands *C* over strands *D*, and around under strands *D*, thus locking *C*, *D*, and *E*.

Weaving the Shade. The weaving of a lamp shade will offer no difficulties to the person who has done any basketry, as the weaves are old, simple, and among the most common weaves used in basket weaving. If a frame is constructed over which to weave the shade, it will simplify the shaping of it. For the beginning, cut from a board ⅜″ thick, a disc three inches in diameter. Bore a hole through the center to fasten the fixture to and bore 25 holes in the edge for 4/32″ stakes. See Fig. 6. These holes will be about ⅜″ apart. Insert stakes, 33″ long, in the holes. With a weaver of 4/32″ material, about fifteen feet long, weave around with the over-and-under weave twenty times, and then insert with each stake another stake, 31″ long, pushing it up as far as possible. Weave seven times around with these stakes double, then begin using them singly, by separating the pairs. There is now an even number of stakes, 50, so it is necessary to use two weavers. Carry the first weaver around until the initial stake is reached. Then start another weaver behind the stake to the right of the initial stake, and weave around to where the first weaver stopped; then use it, thus alternating. Weave around eleven times; then stakes 28″ long are inserted with each single stake. Force them up three inches or more. Then weave in a two-rod arrow, as described in the weaving of the base. See Fig. 4. The desired curve in the top of the shade is obtained by curving the stakes as one weaves.

Open Work. The open work is made by tying the right-hand stake of a pair to the left stake, four pairs to the right. Continue all around the shade, keeping the left stake of all pairs on top and the right stake underneath. This makes a lattice between six and seven inches wide. When the stakes have all been tied and adjusted as nearly as possible, continue the weaving as described below.

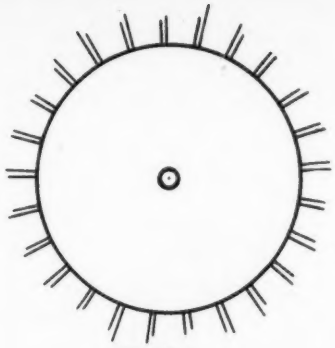


FIGURE 6.

Weaving Below the Open Work. First weave in a two-rod arrow. The tighter this is woven in, the more pronounced will be the curve of the shade, and vice versa. Then weave around twelve times with the over-and-under weave, it being necessary to use two weavers because there is an even number of stakes. Weave with the stakes in pairs, side by side, just as they were above the lattice.

To finish the shade, first cut off even with the weaving the right stake of each pair. Then carry the other stake, by first bending it as nearly as possible to a right angle, in front of the two stakes to its right, back of one, to the outside and in front of the next two, and back of one and to the outside. Then carry the next stake likewise, so on around the shade. Care is necessary in disposing of the last six stakes as they must go in front of or behind stakes which have already been placed. The relative position of these stakes is obtained by studying closely the part completed.

If one desires to stain the lamp, an ordinary stain and varnish can be used with reed; but with the fiber cord, a water stain must be used, and a sizing of casein glue put on afterward. If an enamel finish is wanted, the sizing is put on first.

Building a Speedster Body

Jesse C. Eddie, Saginaw, W. S., Mich.

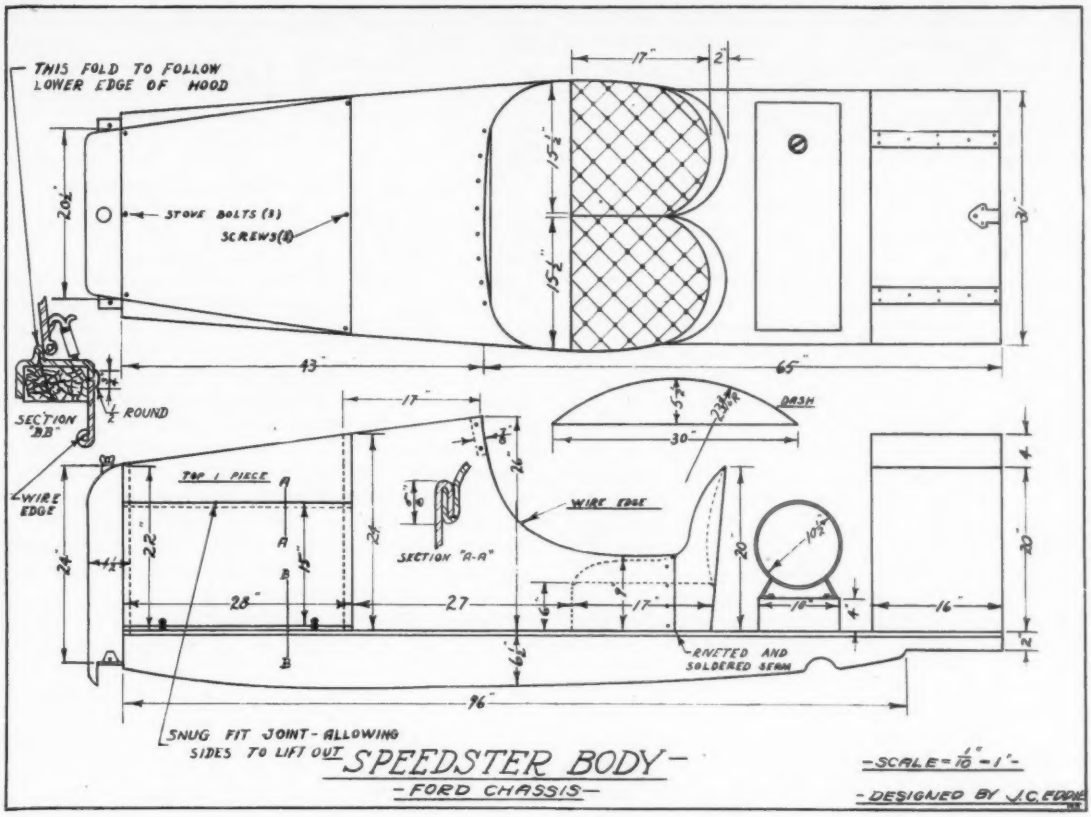
It is very often the case in the ordinary motor mechanics shop that during the winter months a marked decline of repair work occurs. This is a disadvantage to the motor mechanics teacher who depends upon outside work to any great extent, at least, for instruction purposes. Then there is the motor mechanics shop which is fully equipped and seldom, if ever, takes in a repair job. So it is hoped that a project such as is brought forth here will be of value to either type of shop. It will furnish the first with extra work during the dull season, as well as giving them something of a constructive nature which always draws and holds more interest than the ordinary shop routine. It will also make possible the teaching of principles and processes that could not be taught otherwise. To the shop that does not do outside work, it will furnish an actual repair job in rebuilding the chassis, in addition to what can be taught in constructing the body.

The body here described is designed to fit the Ford chassis, but it can be made to fit any small chassis with very little variation. Due to the fact that an old Ford can often be bought for "a song" and especially one without a body, it is recommended that a Ford chassis be used, and rebuilt to dependable serviceability. This can be done in the shop with no labor cost, which is generally the biggest item in a case of this kind, and with very reasonable expense for new or used parts.

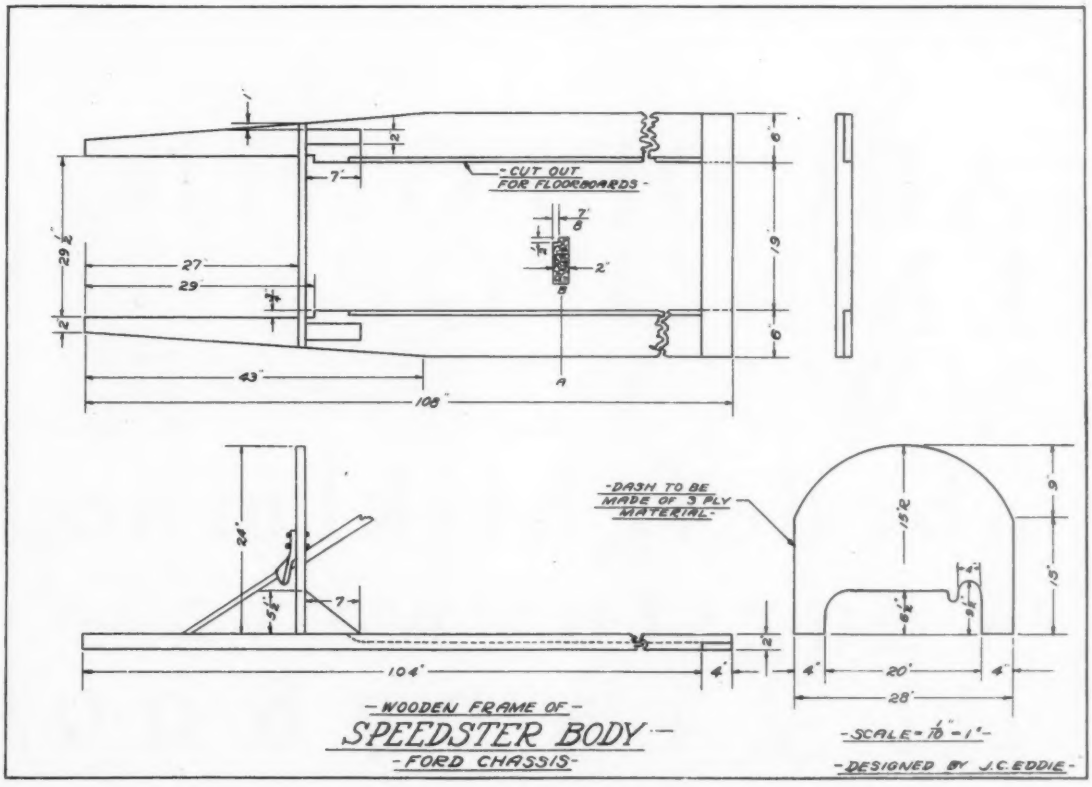
In constructing the body the wooden frame will necessarily be the first part to build. The sills or bed pieces are made from 2″ x 6″ of any medium hard wood. A 2″ x 4″ is half lapped across the rear end. The upper inside corner of the sills are cut out to the depth of ⅞″ by ¾″ to catch the floor boards. A strip ¾″ is cut away from the front and inside of the sills so that the sills will be 1½″ further apart at this point. A notch must be cut from the bottom of the sills so that they will set over the engine bracket and rest squarely on the chassis frame. The dash should be made from ply material. It can be made by the woodworking department of the school, or a piece of sufficient size may be purchased from a furniture store or factory and cut to shape. The angular piece used to support the floor boards should be sufficient bracing for the dash if properly installed.

A good pair of bucket seats can be purchased from any large auto supply house, or can very often be picked up from some shop around town. These are installed on the frame after it has been floored. If the distance from the front of the seats to the dash is correct, the little difference that there may be in the size of the seats will not greatly affect their relative position.

A radiator shell either Fiat or Bullet Nose can be purchased from the American Top and Body Company,



DETAILS OF SPEEDSTER BODY.


-CUT OUT FOR FLOORBOARDS-
-DASH TO BE MADE OF 3 PLY MATERIAL-
-WOODEN FRAME OF-
SPEEDSTER BODY
-FORD CHASSIS-
-SCALE = 1/10 - 1'-
-DESIGNED BY J.C. EDDIE-

DETAILS OF SPEEDSTER BODY.

Delphi, Ind. This is a special shell and no other will work out successfully with this body. If the school is fortunate enough to have a sheet metal shop, the shell can be built very successfully, using a ¼" mesh gravel screen in the front to present a radiator appearance. The radiator tube or filler pipe will need to be lengthened; this is done by getting a six-inch piece of the same size pipe and threading it at the bottom to screw into the radiator and on the top for the cap. The radiator shell should be placed in position before the frame is fastened to the chassis. To fasten the frame to the chassis, place it on the chassis in exactly the position desired, then from the lower side drill holes through the sills, using the old body bracket on the sides of the chassis frame as guides. There will be four of these. After the holes are drilled, fasten in place with bolts. This secures the new body in exactly the same way as the original body. Two 5½" by ¼" bolts will hold the front of the sills in place.

The next step will be cutting and fitting the sheet metal. The best stock for this is 22 gauge anti-rust rolled steel; however, any good metal of 22 gauge will do, ungalvanized preferred. The most successful method of fitting the metal is to cut it after paper patterns. The patterns are comparatively easily made from a few sheets of very heavy wrapping paper. Place the paper in position so that it forms the shape desired, then fasten with thumb tacks and cut to the specifications given, and to the height of the seats. The cowl piece should have a turned wire edge (No. 8 wire) and it is well to allow about ¾" for this. However, cut the pattern just exactly as the finished product will be expected to look, allowing for the wired edge when pattern is applied.

If the sides of the seats are low, it might improve the appearance by making the sides higher and carrying them around to the rear of the seats to make joints. Whether the cowl is made from one or two pieces of stock depends upon the size of sheet available. One piece large enough will cut the side pieces of the hood also. A so-called seamless joint can be made by riveting the parts together, and then filling with solder until it presents a smooth appearance.

The rounding part of the hood should be cut in the same manner as the cowl. The side pieces can be cut from measure. An extra half inch should be allowed on the side of the hood cover and this turned back so as to form a hook. The same is allowed on the side pieces so that the one is made to fit into the other, then having the side pieces lack a little of coming to the sill gives the hood clips a chance to keep the two snugly together. When it is necessary to look at the motor, the side will lift up instead of turning. Clips for the purpose of holding the hood in place can be purchased from any supply house. It is not necessary to have ventilating slits in the hood, but if desired they can be made very neatly by first cutting slits to the desired length with a cold chisel. Lay this on a hard block which has been cut out to the shape desired in the finished ventilator; then with a mallet and a hard wood punch drive the metal down to the shape of the cavity in the block.

The side skirt should be made to fit over the rear radius rods. As this varies according to the amount that the chassis is underslung, it is best left to the discretion of the builder. If turned with a wire edge, it will be much stiffer and more free from vibration.

The steering column is mounted with a couple of pieces of heavy strap iron, drilled and fitted to the steering column. The amount of blocking out from the dash will vary in most cases, so it is left to the judgment of the instructor. When the lower steering gear bracket is replaced at this new angle, it will be necessary to washer it up so that there will be no binding.

An ordinary Ford gas tank is mounted on the rear, just back of the seats. It will be necessary to get a longer gas line, for the natural position of the gas tank is nearer the carburetor. The tank should be raised above the floor as much as convenient. A strong trunk mounted on the rear, will greatly improve the appearance of this job.

AN INTERESTING ALPHABET DESIGNED BY W. BEN HUNT AND ED HUNT.

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

A JOB SHEET IN HOME MECHANICS (General)

F. E. Tustison, The Stout Institute, Menomonie, Wis.

JOB SPECIFICATIONS: To half sole and heel a shoe (nailing).

REASON FOR JOB: It is economy to half-sole shoes. Continual wear soon perforates the sole while the upper remains good. The best shoes can oftentimes be half-soled several times. With a half-soling kit, the work can be done at home very reasonably. Every hardware man carries a complete assortment of half-soles. Discarded leather belting is often used with success in half-soling.

MATERIAL: Half-soles, heels, scrap leather, brass shoe nails, and water.

TOOLS: Stand, shoe last, hammer, pincers, nippers,

FIG. 1. SOLING A SHOE.

peg awl, rasp, No. 1½ garnet paper, shoe knife, and burnisher.

PROCEDURE:

(1) *Remove the Old Sole.* Begin at the toe and work backward to the shank. Cut the stitching between the sole and the welt with care. Bend the sole backward (see Fig. 3) and loosen until the shank is reached. Cut off the sole where you intend to make the splice. Skive the end remaining on the shank (as per Fig. 4), so that it tapers gradually. If a half-sole is nailed on, remove with the pincers. Remove any dust or dirt.

(2) *Prepare the Sole.* Commercial soles are already cut to shape. If a sole must be cut from a piece of leather, use a paper pattern at least ⅛ inch larger than the shoe.

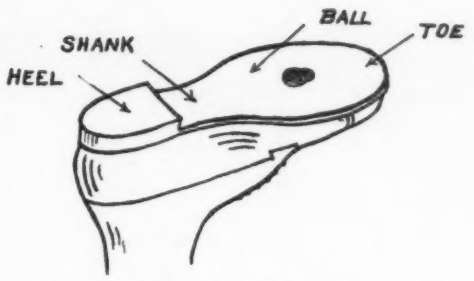


FIG. 2. PARTS OF A SOLE.

Soak the sole in water until pliable. Place the sole on the shoe (rough side down) to test for proper shape. Remove and skive the rough side so that a beveled splice is made. It might be well to examine a half-sole job made by an expert cobbler at this time. Do not skive the sole too thin for the nail heads will not hold. Make a final fitting by placing the sole on the shoe.

(3) *Partially Nail on the Sole (See Fig. 5).* Select a last of proper size and place it on the stand. The stand should be securely fastened with some solid object. Hold the shoe tightly against the last when the nails are driven. Drive a single nail to hold the sole at the toe. Nail the

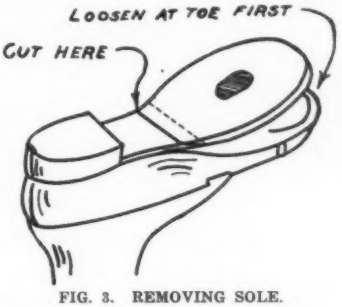
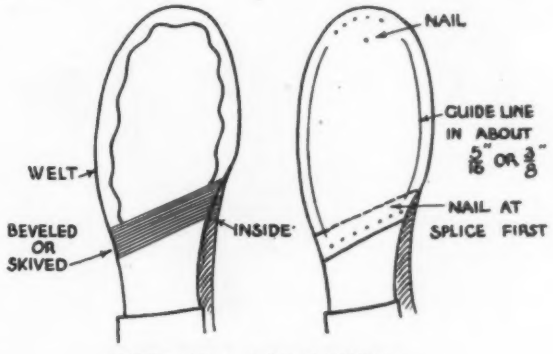


FIG. 3. REMOVING SOLE.

splice with a row of nails as in Fig. 5 about ⅜ inch apart. Use nails that will just clinch.

(4) *Trim the Sole and Finish Nailing.* Remove the shoe and trim the sole about ☆ inch larger all the way round. Take care while trimming not to cut the upper. Gage a guide line around the sole (See Fig. 5) and finish nailing. The beginner should start each nail with the pegging awl. The nail should slant slightly inward. When the nailing is complete, go over the rows and hammer again. Insert the hand and test for protruding nails.

(5) *Finish the Edge.* Trim the edge with the knife. Rasp and finish smooth with sandpaper. The arris of a scrap piece of glass is often used to shape the edge. Burnish (rub smooth with a hard object) and if shoes are tan leave natural color. Apply ink and burnish again



RIGHT—FIG. 4. SOLE REMOVED.
LEFT—FIG. 5. DETAIL FOR NAILING.

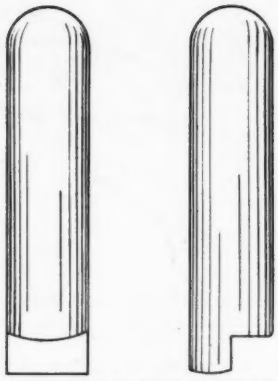
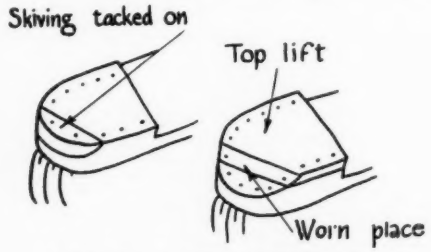


FIG. 6. BROOM HANDLE BURNISHER.

if shoes are black. A burnisher can be made from a piece of broom handle (See Fig. 6).

(6) *Finish the Bottom.* When dry, rasp the row of nails on the bottom so that none protrude. Sandpaper to give a finished appearance.

(7) *Repair a Heel.* Remove the top lift (See Fig 7) and cut off the nails with a pair of nippers. If the back



LEFT—FIG. 8. DETAIL FOR SKIVING.
RIGHT—FIG. 7. WORN HEEL.

is worn down, restore the shape by nailing on leather skivings (See Figs. 8 and 9). Nail on a new top lift and finish as before. If a rubber heel is desired, it is added instead of a top lift. Select a rubber heel as near the same size as possible. Use nails supplied with the heel and do not drive them too deeply. Follow any special directions on the box.

(8) *Nail on Football Cleats.* Boys often desire football cleats. See Fig. 10 for a good arrangement of cleats. Fig. 11 shows the average size and shape of a cleat. Three layers of leather are usually used for each. Fasten with four nails and trim afterwards. Take care in trimming not to cut into the sole.

FIG. 9. NAILING ON SKIVING.

FIG. 10.

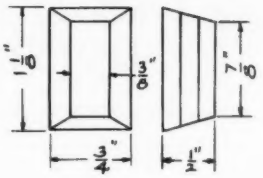


FIG. 11.

QUESTIONS:

(1) Where is the ball of a shoe? The shank?
(2) How long should a shoe nail be?
(3) Which is better, iron or brass nails? Why?

FIG. 12. NAILING ON CLEATS.

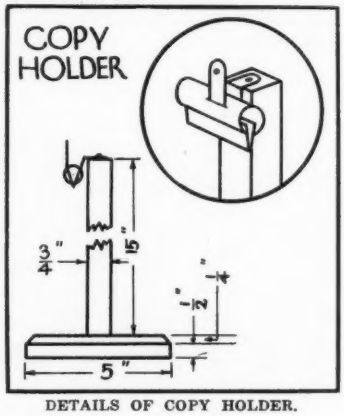
(4) How is the guide line gaged for the nails?
(5) Should the long part of the sole be placed on the outside or the inside?

Reference: Wood and Smith "Prevocational and Industrial Arts," p. 241-251.

PRINT SHOP COPY HOLDER

H. D. Crull, Birmingham, Mich.

In the print shop of our high school, we were constantly confronted with the problem of being able to hold our copy while setting type.



DETAILS OF COPY HOLDER.

The accompanying illustration shows how we solved this problem. Today we have a copy holder for every student enrolled in the print shop and they were made at a very nominal cost. They not only serve as copy holders, but also as a means of holding the copy until the next class, as they are placed in a rack. By doing this, no time is lost in searching for copy at the beginning of class periods.

The stock is of sap gum. The base is of ¾" x 5" x 5" with a ¼" chamfer on the top side. The upright is ¾" x ¾" x 15". This is held to the base of a 2" flathead wood screw and brads to keep the upright from turning on the base.

At the top is placed a paper clamp. These were purchased at a local store at a cost of two for five cents. Care must be exercised in bending the one arm of the clamp as it will break if bent too sharply. This is held in place on top with a ¾" roundhead blue screw.

This is an excellent seventh grade wood-shop project, as squaring and assembling are brought into the problem.

DECOYS AS A SHOP PROJECT

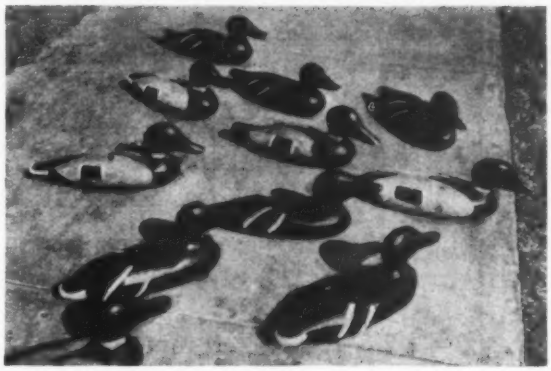
Robert T. Randol, Fort Smith, Ark.

The decoys in the accompanying illustration were made by a student in the Fort Smith, Arkansas, high school. A little story goes with the making, that is worth repeating.

The boy who made these decoys was up until the middle of November, 1924, a regular truant and gave the principal, as well as his other teachers, lots of trouble by staying out of school. He came to school about one day out of four, and it was a hard matter to find where he was spending his time. His mother would declare that her son was in school and would always say that he left home at such and such a time, but the chap never reached school.

The principal came down to the wood shop one day and asked what kind of work this boy was doing. I told him he was a very hard problem to solve, that I had attempted to sound him out, but up to now he had been a failure at everything he had attempted. After some discussion I suggested that I would try to find some activity that held the boy's interest.

Under the term "enjoyment" on the boy's personal record card, I found these three things: playing football, roller skating, hunting. For the next few days I paid strict attention to the conversation which the lad had with the other boys. One day I overheard a conversation something like this: "Talk about ducks! Why the river is covered with them, and only yesterday I killed four big mallards." This was enough for me, for I was sure that I could soon find something that would make a B student instead of an F.

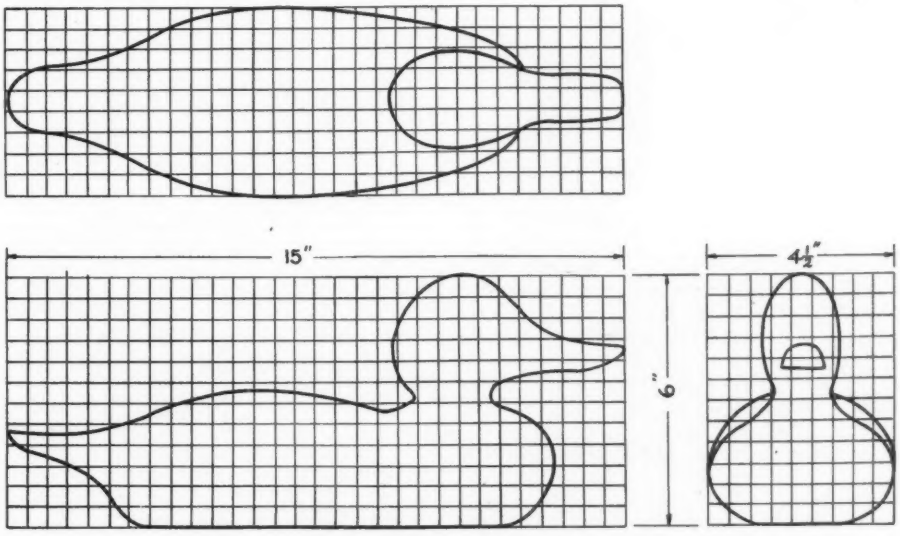


DECOYS MADE BY STUDENTS OF THE AUTHOR.

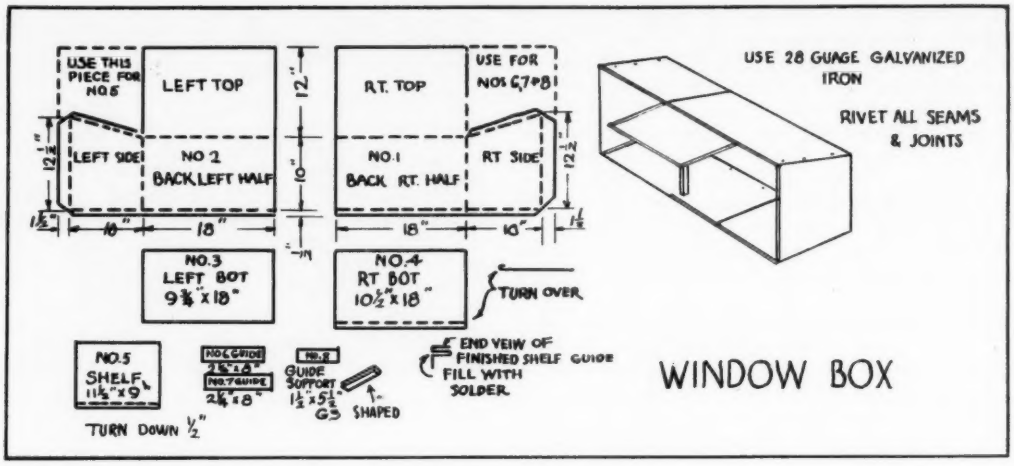
The next day I helped him out with a joint he was making a miserable "to do" about, and asked him offhand if he liked to go hunting. He told me he "sure" did. I asked him what he hunted for at this time of the year. He said ducks, and added that they were very plentiful down on the river. At this point was my time and I asked him if he had any decoys. He answered that, if he had decoys, he could get three times as many ducks as he had been getting in a whole week. I suggested that he could make some in manual training period.

The first question was, "Do you think that I can make them?" and I assured him that it was very simple but lots of hard work. The snapshot shows the outcome of his efforts.

Since starting the making of these decoys this student has been at school every day and has been begging me to let him come to the shop and work during his study hall periods. I told him that he had to keep up his work for the other teachers or he couldn't come. Before the end of the semester he told me that all of his grades were above "B."



DETAILS OF DUCK DECOY.


USE THIS PIECE FOR NO.6
LEFT TOP
R.T. TOP
USE FOR NOS 6,7 & 8
LEFT SIDE
NO 2 BACK LEFT HALF
NO.1 BACK RT. HALF
RT SIDE
12"
10"
18"
NO.3 LEFT BOT 9¾" x 18"
NO.4 RT BOT 10½" x 18"
TURN OVER
NO.5 SHELF 11½" x 9"
NO.6 GUIDE 2¾" x 18"
NO.7 GUIDE 2¾" x 8"
NO.8 GUIDE SUPPORT 1½" x 5½" G.S. SHAPED
END VIEW OF FINISHED SHELF GUIDE FILL WITH SOLDER.
TURN DOWN ½"
USE 28 GUAGE GALVANIZED IRON
RIVET ALL SEAMS & JOINTS
WINDOW BOX

DETAILS OF WINDOW BOX.

WINDOW BOX OR REFRIGERATOR BOX

E. R. Lowrie, Lorain, Ohio

The window box, illustrated below, was designed as a class project in our sheet metal course, to meet the needs for problems that arouse interest, and fill a need in the homes of our students.

The window box is simple in design and easy for the students to work out. It is intended to take the place of the cabinet in the cellar or the indoor refrigerator box. It is handy and very convenient. It is adjustable and can be attached to any window sill.

We do not recommend that pupils paint or enamel the box as these coatings have a tendency to raise the temperature of the inside of the box where sunlight strikes it.

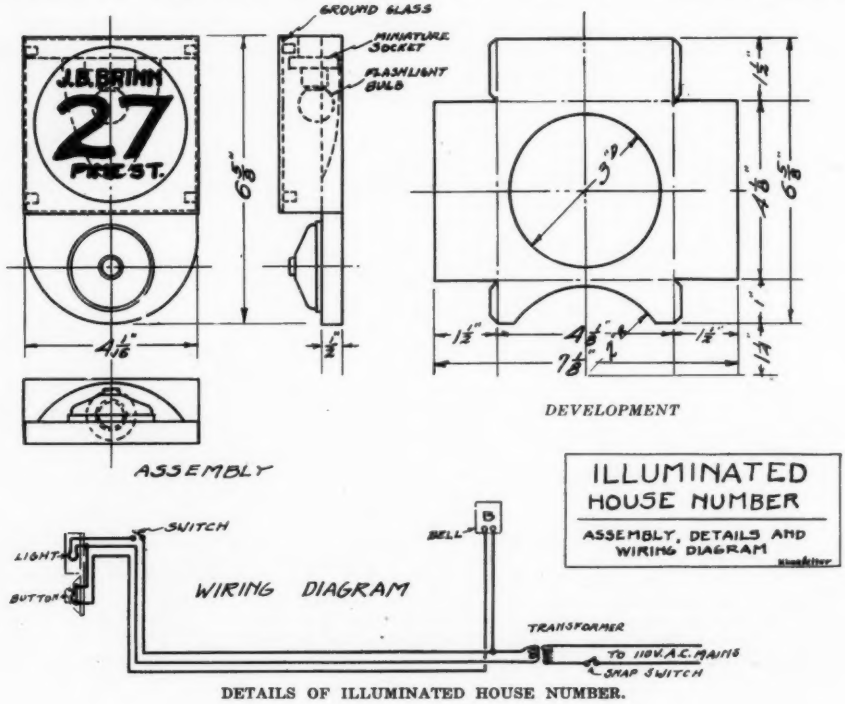
Either 24 or 28 gauge galvanized iron may be used.

The rolled edge at the top can be made best by leaving it for the final operation. Place the pieces of the box one inside the other, and roll the top edge backwards over an iron rod. This gives uniformity and makes a good groove that acts as a slide.

ILLUMINATED HOUSE NUMBER

L. M. Klinefelter, Norfolk, Va.

This little problem is of considerable interest and practical value for boys in almost any shop, as it involves not only electric wiring and the study of circuits, but also some sheet metal and woodwork, painting and glass-cutting. The form and construction can be modified to suit materials and equipment at hand, and in a shop doing foundry work, or art metal work of any sort, quite an artistic job might be turned out. In the one shown, the back is gouged out to make room for the light, without making the box appear too deep. The ground glass in the front is held by little clips soldered to the inside of the box. The wiring is brought out of the back and run through a single hole in the wall. Being a low voltage system, no great care is necessary in insulating the wires. The switch, shown near the left-hand end of the diagram,



DETAILS OF ILLUMINATED HOUSE NUMBER.

is for cutting off the light during the day. It does not affect the operation of the bell. The transformer is the usual bell transformer, or may be one made in the shop.

A COMMUNITY CHEST PROJECT

C. A. Kunou, Supervisor of Manual Training, Los Angeles, Calif.

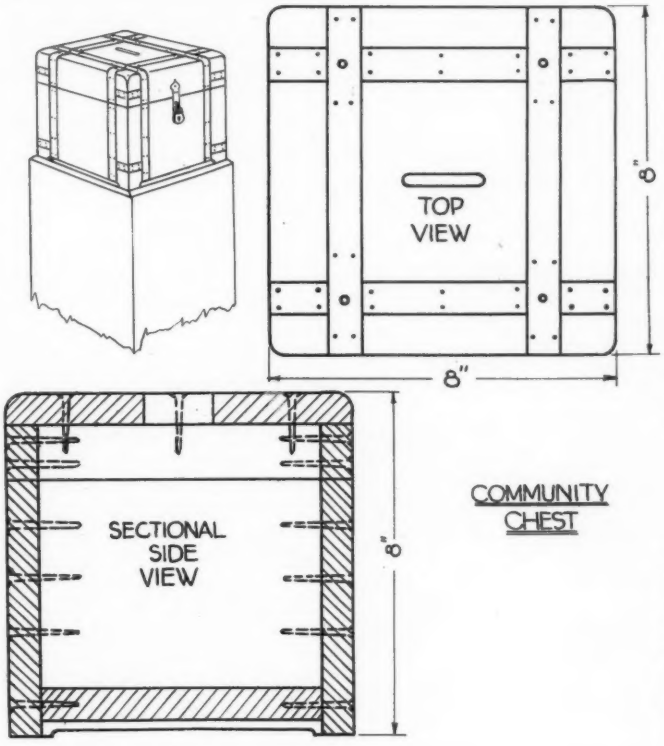
The Community Chest, illustrated in the accompanying drawing, was made in the various elementary schools of Los Angeles, in October, 1924, in connection with a Community Chest Campaign, in which the schools took part.

The Chest is made of pine, surfaced to ¾" thick.

After the box has been glued and nailed, it is sanded all over; stained with water stain of Bismarck brown, darkened with black or with chrome green neutralized with brown for olive green. Two or three coats of shellac are given, and rubbed with pumice stone.

The lid is then cut from the body of the box. The hinges are attached and the hoops are nailed on with ½" escutcheon pins. The hinge hasp and padlock are finally attached.

The pedestal is made of ½" wood, glued and nailed together.



AN UMBRELLA RACK

Eber L. Moore, Connersville, Ind.

The accompanying drawing illustrates a problem that is useful in almost every school building. As a class production problem, it would be interesting to make a rack for every classroom of the building. The tool processes are simple, involving cold bending, riveting and drilling.

SAW HORSE AND GLUING SET UP

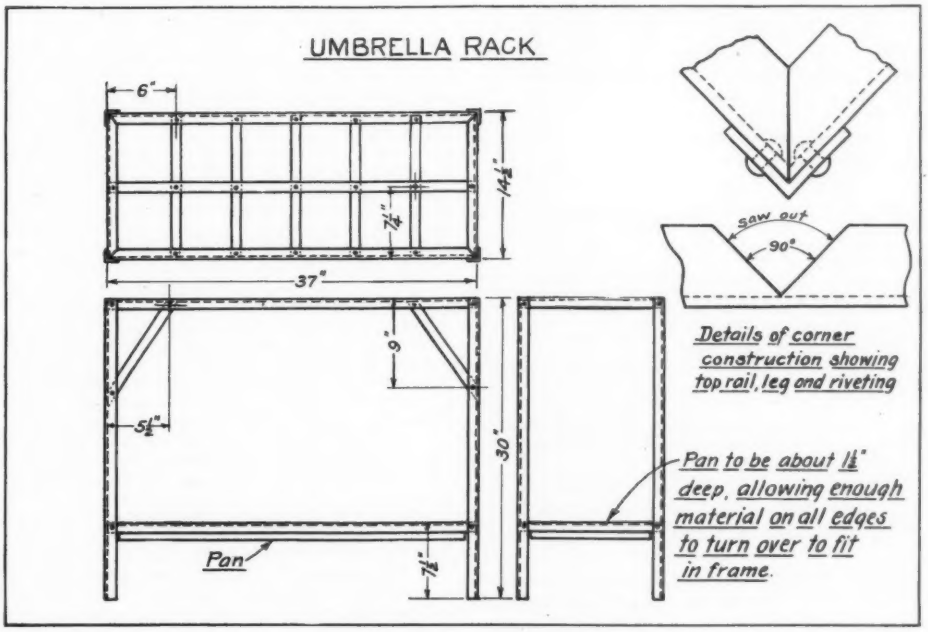
W. A. McGinnis, Langley, Wash.

This project was designed and built at the Bremerton High School, Bremerton, Washington, and was found to be very useful. The saw horse can be used for any ordinary shop purpose.

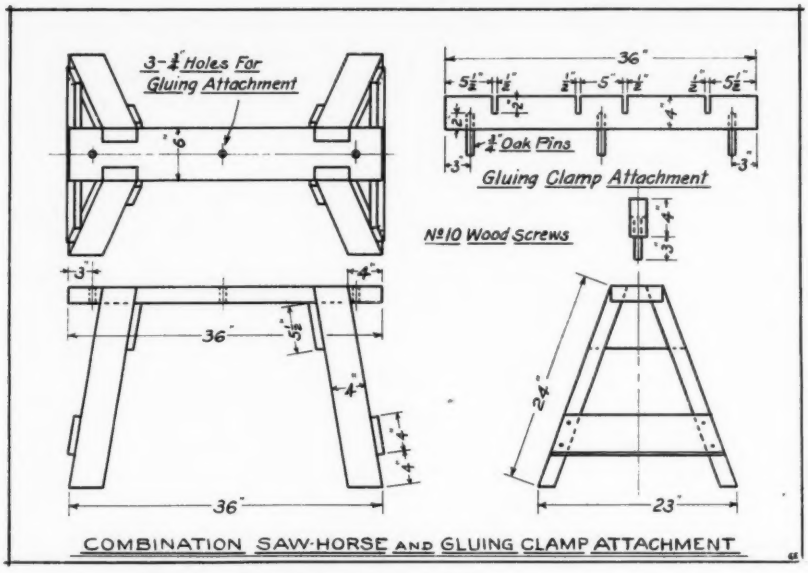
LUMBER AND TOOL INVENTORY SHEETS

A. E. Edmonds, El Monte, Calif.

The accompanying forms are successfully used in the El Monte Union High School for inventorying lumber, and tools and supplies. The forms measure 6"x9½" and are punched to fit a standard loose-leaf note book. The inventory is checked at the beginning of each year, articles received are entered, and a final inventory is taken at the end of the year. A separate list of missing and broken tools, lost books, etc., is made up.



DETAILS OF UMBRELLA RACK.



COMBINATION SAW-HORSE AND GLUING CLAMP ATTACHMENT

A large table, about ten feet in diameter, is in the middle of the group. This table holds all the big tools and machines. It is two feet wide around the outside and is open in the middle. There are two reasons for this open space. First, it furnishes place for machines that hang over the edge and also for storing otherwise awkward boards, pipes, etc. Second, it emphatically prevents the table from becoming a useless catch-all.

Hexagonal tables have been in use for some time in the Roosevelt school and have proven to be practical and efficient.

HEXAGONAL TABLE IDEA

A novel idea in shop furniture is being carried out in the shop of Mr. L. H. Lovelace in the Roosevelt junior high school, San Diego, California.

The idea consists of six hexagonal tables arranged in a circle around a large table of the same shape. Five boys work around each table, one at a side. This leaves one side always free for the instructor, eliminating the time and annoyance of making room. The six tables are arranged in a circle and the teacher's side of each table is inside the circle. Therefore it is very easy for the teacher to step from one table to another and so be in the very heart of any group that needs him.

Mr. Lovelace finds this plan best adapted to the work in household mechanics for the reason that the work in that course is individual and diversified. He has his classes divided into groups of five each. Each group works on something different, and the groups rotate. In this way each table can be permanently equipped for the work of its particular group. The soldering equipment is on one table; wood vises and tools for woodwork are on another; machine vises, on a third; small anvils for art metal work, etc., are on another; sheet metal machine tools are on still another. One table is a blank—that is, no permanent equipment is placed on it. It is left free for various uses as they occur. It can quickly be equipped for electrical work or what not.

INVENTORY OF TOOLS

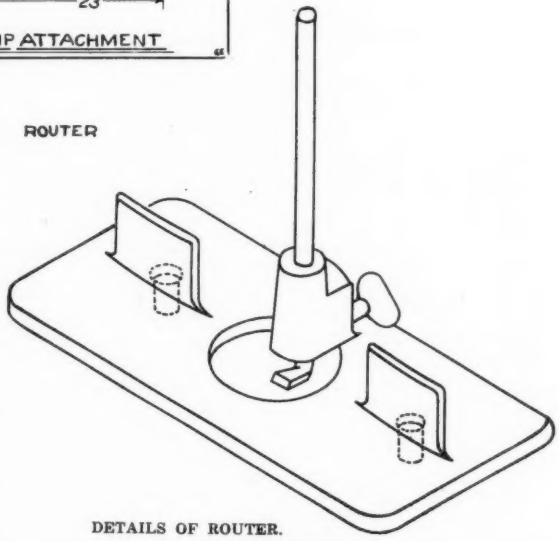
DATE_____

	No.	Name of Tool	Remarks. Repairs Needed

LUMBER INVENTORY

MATERIAL_____

	DATE	PCS	In	W	L	Ft	@	Amt	



DETAILS OF ROUTER.

—**The National Thrift Committee** of New York City has prepared an announcement concerning the observance of National Thrift Week which will take place January 17th to 23rd. The observance of thrift week provides a patriotic event and is an excellent opportunity for thrift teaching.

The committee offers an increased service which is available to teachers in 1926. Interested teachers may secure free copies of the new calendar poster, with official dates and topics for the season; also a descriptive folder giving objects and purposes of national thrift week. The materials available to teachers include wall posters, budget books, topics for essay work, and a portfolio of plans for the observance of Franklin's birthday.

To Offer Trade Guidance. In adopting a budget estimate for the next year, the New York City board of education has included appropriations for two changes in the school system. The sum of $15,000 has been provided for the appointment of six vocational counsellors to act as guides to children in the junior high schools and continuation schools, who seek employment.

Another sum was voted for the employment of two psychiatrists, to be assigned to the high schools. These officials will handle "problem" cases, particularly among girls.

Mr. F. M. Lindley, a graduate of Stout Institute, has been employed to teach printing at Cicero, Ill.

Mr. Harvard C. Smith, also a graduate of Stout Institute, has accepted a position at Kenosha, Wis.

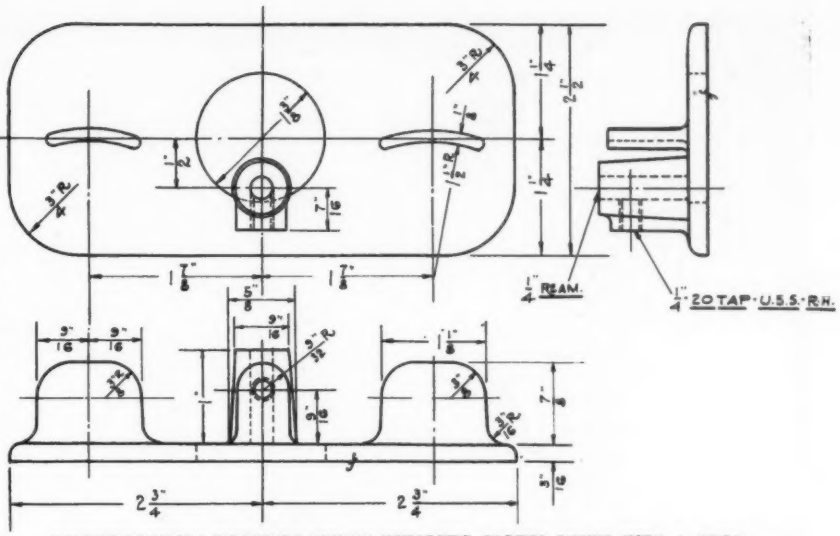
Mr. Edwin Meyer, who taught last year at Milwaukee Vocational School, has accepted a position at Corvallis, Ore.

ROUTER

C. W. Illingworth, Instructor of Pattern Making, Racine, Wisconsin

A light weight, but substantial router, made of cast iron with cutter of ¼" drill rod is shown here.

The pattern for this casting makes a good project for the pattern shop and foundry as it brings out the point of coping down into a hole. The sand for the center hole must be in the cope and this involves a lift in the cope. The bottom face should have a smooth finish. There are holes to be drilled, tapped, and reamed and a cutter forged and tempered in the machine shop. This router may be used on large work by simply screwing on the bottom a board of the desired length. The two holes near the handles are for the screws.

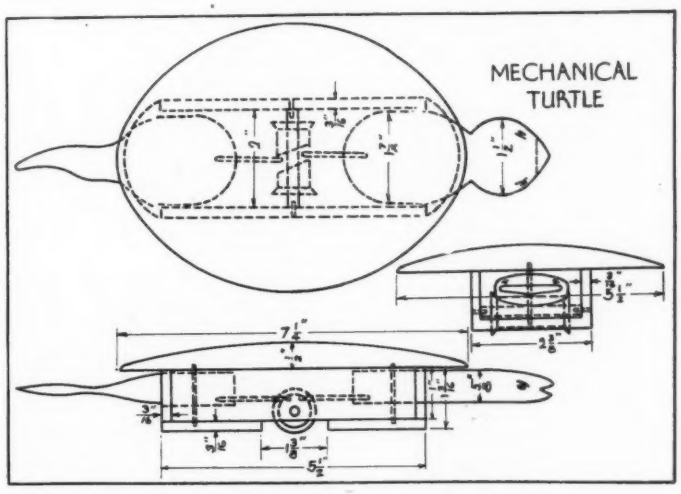


PATTERNMAKING EXERCISE WHICH INVOLVES COPING DOWN INTO A HOLE.

A MECHANICAL TURTLE

J. M. Brice, Fort Dodge, Iowa

This problem may be made an interesting whittling project by using close grain soft pine and a pocket or sloyd knife; or it may be made a sixth grade toy problem. A spool may be used as a roller. Cut an irregular groove in the spool. The wires, if fastened to the head and tail, will move, making the turtle appear alive.



DETAILS OF MECHANICAL TURTLE.

TRAINING FOR PLUMBING TRADES

A movement has been inaugurated in Pennsylvania by which apprentices for the plumbing trade are to be trained. A preliminary conference was held between employers' employee groups and educators at the Pennsylvania State College, and another is called for September 16th.

The employers and employee groups are in practical agreement as to the establishment of a school and the scope of the same. The educational side is represented by Prof. W. P. Loomis while E. D. Barry represents the State Federation of Labor. The employers are represented by President Richard Turner of the State Master Plumbers' Association.

Vocational directors and teachers of plumbing from Erie, Pittsburgh, Braddock, Johnstown, Altoona, North Braddock, Coatesville and Williamsport with the state vocational director will participate in the deliberations. The first conference advanced the following statement upon subsequent negotiations will be based:

"The problems of apprenticeship in any given community should be under the control of a commission of school officials, journeymen and masters.

"Public understanding of apprentice needs and methods of meeting these needs should be built up by local conferences on apprenticeship by publication of apprenticeship facts, and by personal publicity by organizers of training.

"A state joint commission on apprenticeship is recommended, composed of an employing plumber, a heating contractor, a journeyman plumber, a steamfitter, and a school representative. The objectives of this State Commission are to champion the cause of apprenticeship training in Pennsylvania, to make general knowledge of the State Plan of Vocational Training, to advise schools how they can cooperate with the trade in training apprentices, to suggest ways and means of getting adequate apprentice training, to set up qualifications for apprentices and their instructors, to suggest plans for certification, records and examinations, and to issue bulletins of suggestions and approved training standards.

"The responsibilities and powers of the local joint commission include making a survey of conditions, making apprenticeship rules, assisting schools to provide instructors and other instructional facilities, outlining a course of study, safeguarding the training of apprentices on the job so that they receive thorough experience in all branches of the trade, and the hearing and deciding of complaints. The joint commission is to act in an advisory capacity to the school board, which in turn should seek the advice of the joint commission.

"Part-time or evening classes supplementary to the trade are to be preferred for apprentice training in the plumbing and heating industries.

"The minimum experience recommended to qualify for instructor of apprentices is set at not less than five years as a journeyman after a standard apprenticeship period. The instructors are to be trained in approved instructor-training schools.

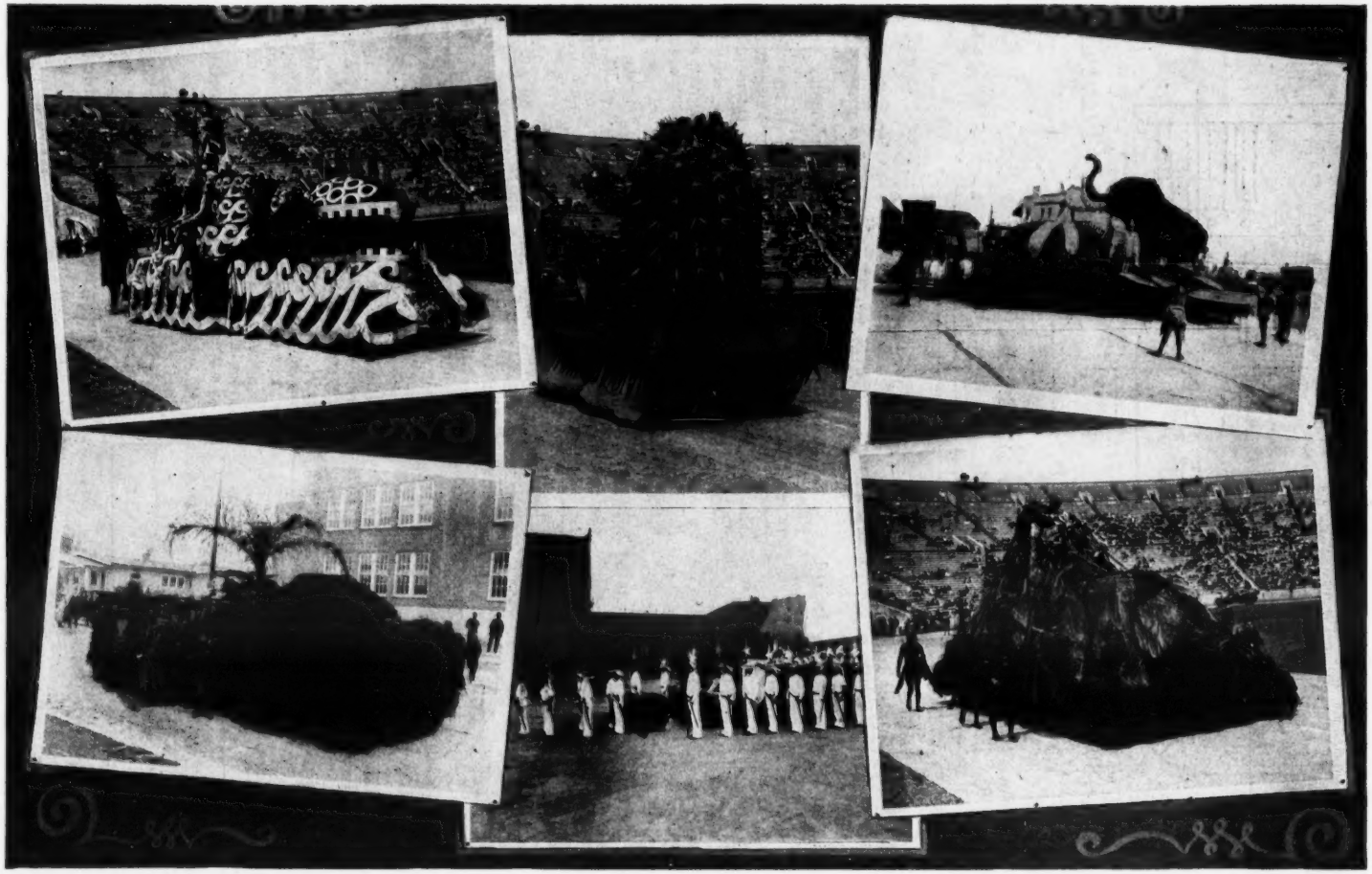
CALIFORNIA THE GOLDEN

Civic and Floral Parade by the Los Angeles Schools

C. A. Kunou, Supervisor of Manual Training

A Civic Floral Parade and Pageant, conceived, designed, organized and executed by the schools of Los Angeles. An achievement in artistry and orginality unequaled in educational work. A project demonstrating latent abilities of teachers and pupils in the high and elementary schools on a stupendous scale. A spectacle showing a schol system in the light of patriotic, cooperative, educational efforts, with far-reaching educational results in activities of constructive and decorative nature. A procession of one hundred and fifteen (115) floats in eight (8) divisions with some sixteen hundred (1600) costumed, actively participating children. A revelation in beauty and perfection of execution, construction, costuming, decoration and stage efforts, in which everything was the work of the students and teachers. Most of the great mass of flowers used were raised and cultured by children in their home and school gardens. A procession of school pagentry, lasting from 10 a. m. until 1 p. m., without an accident, mishap or obstruction demonstrating superb organization and executive ability by those in authority.

This was the so-called Civic Floral Parade presented by the schools to the City of Los Angeles on Friday, June 5th.



The purpose was to present in living features the romantic story of the Golden West by designing, constructing and executing floats depicting some particular period or noteworthy event in the history and unfolding of the West from the period of primitive man to the present time. The idealistic beauty and charm, the exquisite daintiness in the arrangement of flowers, costumes, and stage features was noteworthy. The constructive effort of the boys and girls, as well as of the teachers, was an educational revelation. This unparalleled educational project was in charge of committees ranging from the Assistant Superintendent down to staffs of every department of the schools, coordinating and unifying these departments in an achievement for the common good. Following are specifications of the committees in charge:

Division I—Advance Section—Chief of Police, Grand Marshall, The Colors, Al Malaikah Temple Band, Parade Title, Emblematic Float; Flowerland, Board of Education and the superintendent of schools and staff.

Division I—The New Land—A group of thirteen floats and a pageant group representing various features of California, like The Desert, the Spirit of the Redwoods, Gold, Oil, Fruits, etc., etc.

Division II—Child of the West—Nine floats representing Cliff Dwellers, Zuni, Painted Council Rock, and other myths and legends of the primitive peoples of the West.

Division III—The Quest for Gold—Representing mythical, historical, and recent searches for gold.

Division IV—The Shores of the Pacific—Eleven floats representing typical continents and islands of the Pacific, including Arctic Ice and Russians at Sitka, China, etc.

Division V—Under Four Flags—The romantic history of the city of Los Angeles under the sovereignty of Spain, Mexico, the Republic of California, and the United States. Twenty-two floats typical of California history.

Division VI—The Winning of the West—A group of fifteen floats representing such historic incidents as a "Forty-nine" Gold Camp, Panama Canal, Santa Fe Trail Stage Coach, etc.

Division VII—The Golden State—Typifying California of the present day. Nine floats representing the charm of Los Angeles, Sea Gardens, etc. The most important feature of this division shows a pageant entitled "The Aqueduct" representing prosperity pouring from the Sierras to the shore of the Pacific.

Division VIII—The Golden Future—Six floats and a feature spectacle showing "The Play World of the West" and schools.

JOINT MEETING OF WESTERN ARTS AND MIDDLE WEST VOCATIONAL EDUCATION ASSOCIATIONS

The Western Arts Association and the Vocational Education Association of the Middle West, will meet in joint convention March 15 to 20, 1926, at Des Moines, Iowa. The two associations have much in common, and it may be expected that both will gain in the matter of attendance and importance of program by the joint session. The combined meeting is in line with the movement which was started several years ago, looking forward to uniting all forces of the country concerned with vocational education.

The program, as planned at present, involves independent meetings of the several sections of the two general groups, and combined sectional meetings and combined general meetings of all persons present.

The local arrangements for the convention are under the direction of Mr. Roy C. Woolman, Director of Vocational Work, and Miss Estelle Hayden, Director of Art Education of the Des Moines schools. At the present writing, the headquarters and the meeting places have not been officially announced. Plans are under way for securing reduced railroad fares.

OBJECTIVES FOR THE PRINTING INSTRUCTOR

In a recent issue of the Printing Instructor, Merritt W. Haynes discusses the objectives of teachers of printing. We reproduce the following paragraphs taken from his article:

"The instructor who can attain his end must himself be a good craftsman, capable of analyzing a printed specimen, of recognizing its excellencies and defects, and of understanding the causes thereof. He should point these out to his students, by exhibiting specimens of both

HARVEY FREELAND,
SUPV. TRADE & INDUS. EDUC., DEPT. OF VOC. EDUC.,
LINCOLN, NEBR.

Mr. Harvey Freeland, who has been state supervisor of trade and industrial education in Iowa during the past five years, has been appointed to fill a similar position in the State Department of Nebraska. Mr. Freeland succeeds Mr. L. A. Hartley, who resigned to accept a position as educational director for the National Founders' Association.

good and poor typography with clear analysis of each, by encouraging pupils to analyze and judge printed work, and by having them do much work in resetting such specimens in better style. Thus can he instill into his students a more refined taste so that they will demand better printing when they have occasion to buy it in any form, either as books and magazines, or in ordering special jobs of printing. Certainly every child should be taught to scorn closely printed text in fine type with crowded margins, bizarre or gaudy display, smudgy or faint inking, and cheap or inappropriate stock. Pupils can be trained to prefer printing that is in good taste in type arrangement, stock, color effect and presswork.

"To develop critical appreciation of good typography on the part of the great mass of the public who are not

L. E. STOCKWELL,
SO. BRANCH OF THE UNIVERSITY OF CALIFORNIA,
LOS ANGELES, CALIF.

Mr. Lynn E. Stockwell, who has just become assistant supervisor of teacher training in industrial education at the Southern Branch of the University of California, Los Angeles, is a graduate of the Stout Institute, and holds the degrees of Bachelor of Science and Master of Arts from the University of Minnesota. Mr. Stockwell has had considerable experience in teaching vocational subjects in Minnesota schools, and has been recently head of the Department of Manual Arts in the University of Minnesota High School, and part-time instructor in the Department of Trade and Industrial Education in the University of Minnesota.

producers of printing, but are consumers of typographic products, is an objective much to be encouraged by the printing industry as well as by the educators."

Industrial Arts Vocabulary

F. S. Crispin, Philadelphia, Pa.

Compass Saw—A short, narrow hand saw, tapering toward the point used for cutting curves.

Complicate—To make complex; difficult, or hard to deal with.

Components—The various forces which combine to make the resultant; parts of a compound.

Composition—A compound, as an alloy. A putting together of parts to form a whole.

Composite Order—(arch.)—The most ornate of the classic orders of architecture. It includes some elements of each of the other orders.

Compound Sliding Table—The table of a machine tool to which the work or tool is bolted and provided with at least two movements, one longitudinal, the other transverse.

Compression—Pressing together—the opposite of tension.

Concave—Hollow and curved; a depressed curve.

Concentrated Load—(arch.)—A load localized upon a beam, girder or structure.

Concentric—Having a common center.

Conception—A plan or invention of the mind; an idea.

Conciseness—Expression of much in brief form; being comprehensive yet compact.

Concrete—Cement with sand, broken stone, or gravel, whose proportions vary with circumstances.

Condenser—A vessel in which the condensation of gases is effected.

Conduit—A conductor, as a large pipe for fluids or as a pipe used as a container for electric wires.

Cone—A solid figure that tapers uniformly from a circular base to a point.

Cone Clutch—A common form of friction clutch in which the power necessary for driving is effected by the friction of smooth turned conical surfaces outside and inside, respectively.

Conjugate Axis—The right line which crosses the transverse axis of a curve at right angles; the shortest diameter in an oval or ellipse; parallel with the base of a parabola.

Constant—A number deduced from actual experiments and used as a basis in calculations.

Construction—The act of building; also that which is built; style of building as of steel or iron construction.

Continuous Beam—A beam which rests on more than two supports.

Convection—The setting up of currents by the heating of a liquid in a vessel; movement of heat through a gas or liquid by motion of parts.

Convex—Curving outward like the surface of a circle or globe.

Conventional—Resulting from or established by custom; formal.

Convey—To impart; to communicate.

Cope—The upper portion of a loam mould, or the top flask used in green sand moulding.

Coping (arch.)—The cap or top course of a wall, frequently projecting.

Copper—A metal, reddish brown in color, variously used in the arts, not strong but tough, especially valuable in the formation of alloys.

Corbel (arch.)—A bracket or support, a stepping out of courses in a wall to form a ledge—to corbel out.

Cord (wood)—Cut in 4 ft. lengths, generally for fire wood. A pile of wood measuring 4′x4′x8′.

Core—A central portion. In foundry work a body of sand, either dried or green, which permits the obtaining of holes, depressions, etc., in a casting.

Core Box—A box commonly made of wood, in which the core is rammed up.

Core Hole—A cast hole cored with a dry sand core instead of delivering as a hole directly from the pattern. In general the term is applied, however, to any hole in a casting which is not bored or drilled in the shop.

Coring Out—The forming of the interior portions of castings with cores.

Coring Up—The placing of the cores in their positions in a foundry mould ready for casting.

Corinthian Order—One of the five orders of architecture in which the conventionalized acanthus leaf is freely used as a decoration of the capital.

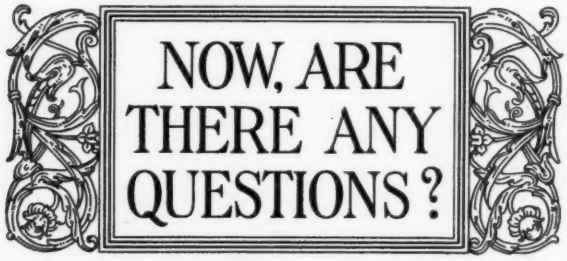
Cornice (arch.)—The projection at the top of a wall.

Corridor (arch.)—A passageway in a building.

Corrode—To wear away gradually as by rusting.

Corrosion—The rusting or oxidation of metals by contact and chemical union with oxygen in a damp atmosphere.

(To be Continued)



Refinishing School Desks

Q. 544. Recently we have taken over the equipment from a school in Lexington, Ky. With the equipment is a number of classroom desks that need refinishing. The old finish is a cherry or mahogany.

We are very desirous of refinishing. Will you please tell me what color stain to apply over this that will look best and how much will I need for about one hundred desks?—E. B. C.

A. In case the desks are in good mechanical condition with the tops free from knife and pencil cuts, they may be washed thoroughly with a solution of Gold Dust in about the proportion of three tablespoons of Gold Dust to a ten quart pail of hot water. This should be applied vigorously with a scrubbing brush, and followed by sponging with clean water containing about a pint of vinegar to a gallon of hot water, in order to thoroughly neutralize any traces of caustic remaining from the Gold Dust. At least two days drying in a warm room should then be allowed. A coat of high grade floor varnish such as Pratt & Lambert 61 or Boston Varnish Co. Kyanize of the walnut varnish stain type, should then be applied with a 2½″ or 3″ Fitch brush and allowed one week to dry. This coat should be sanded smooth and cleaned with a 6-0 split garnet paper. Avoid using a sheet of ordinary single surface paper since the backing of the sand is too heavy and will cause the paper to glaze and scratch. For this reason use stock which can be split. Dust off thoroughly and clean off with a "tacky cloth." This may be prepared from a piece of shirting wrung out in water as dry as possible, and after being opened up should be wet with varnish and again wrung dry, taking care that all cloth edges are thoroughly saturated with the varnish. This should be hung in the air long enough to allow the cloth to become slightly sticky and free from excess moisture. With this practically all traces of dust or lint can be removed and the second coat of varnish applied. It is best of course to do the dusting and cleaning in one room and the varnishing in another, otherwise the last coat of varnish will be spoiled by lint and dirt. This coat should also dry a week and the full gloss will probably be found satisfactory for school purposes.

In case the old tops are in bad mechanical condition, they will need to be resurfaced and sanded either by hand or machine. Where a drum sanding machine is available, there will be a considerable saving in having these tops resanded by machine at a given price per top than to attempt to hire day labor for the job. Any holes or abrasions can then be filled with stick shellac made for burning in purposes. A very small soldering iron should be heated sufficiently to cause the shellac to flow quickly without bubbling, and the holes should be filled slightly more than level in order to allow for cleaning off with a sharp chisel and leveling with a fine sandpaper and block.

The tops should now be sponged with clear water to raise any machine sanding scratches or bumps. When dry, they should be hand sanded with a block and 00 sandpaper to be given a clean surface. A coat of brown mahogany water stain should be given and 24 hours allowed for drying. Do not sand the stain coat. Apply a coat of orange shellac, reduced with two volumes of denatured alcohol and allow to dry. When hard, sand with a split 6-0 paper and proceed as given for varnishing.

I believe that a gallon of alcohol, a gallon of orange shellac, a pound of brown mahogany water stain, and a gallon of walnut color varnish, three dozen sheets 6-0 double surface garnet paper, and one 2½″ or 3″ Fitch brush will be sufficient for this job.—R. G. Waring.

Bronze Finish on Trophy Shields

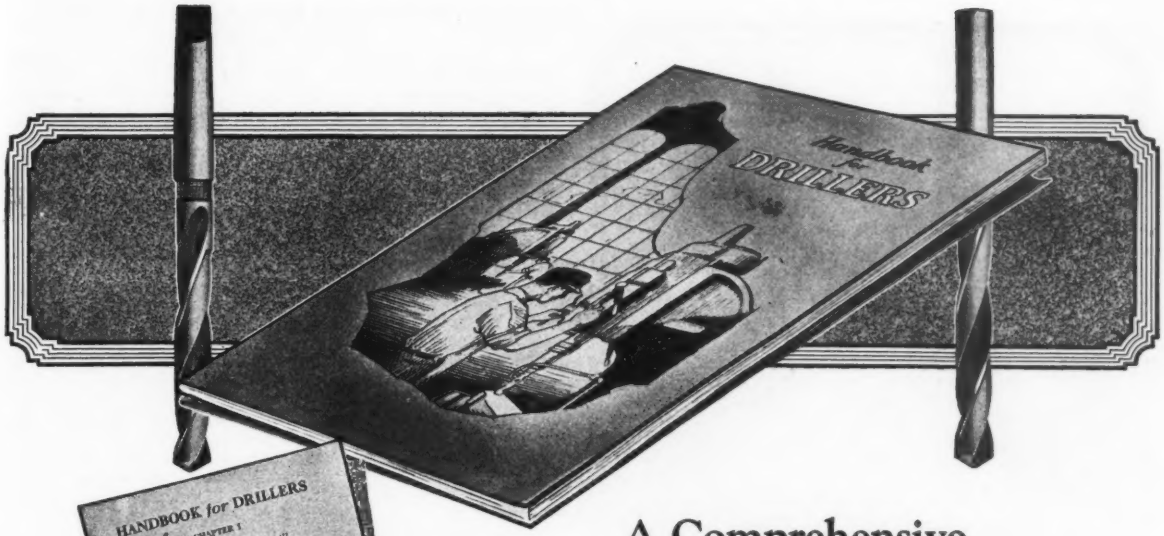
Q. 529. Can you please give me some information on the finish for bronze on five ply birch panels to be used as athletic shields?—C. F. A.

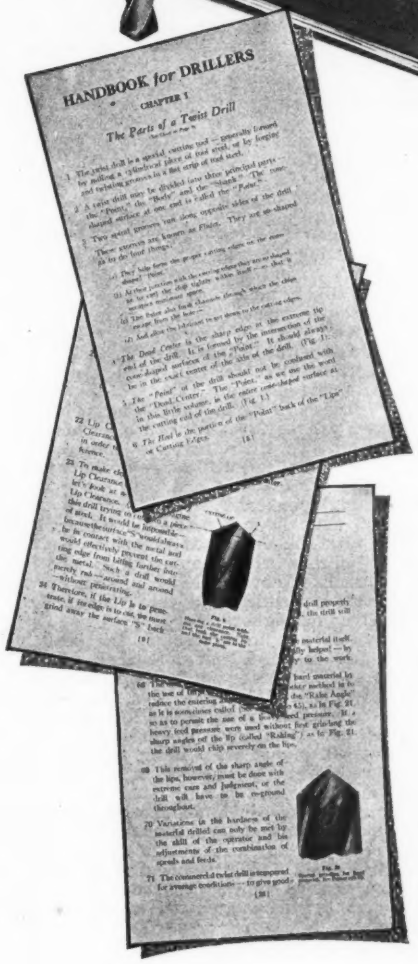
A. Sponge the panel thoroughly, but carefully, with clear water and a clean sponge sufficiently to thoroughly raise the grain without touching the wood with the bare hand, thereby avoiding the black spots which are sure to occur on contacts with the fingers. Dry thoroughly and sand glass smooth with 4-0 or finer paper, preferably split. Be sure that the surface is absolutely true and smooth since the finish is to imitate metal. Stain the panels a dark rich brown, using a water stain only. Let dry 24 hours and apply a thin coat of orange shellac, reduced with two volumes of alcohol. Let dry five hours in a warm room and sand with 6-0 split paper to an absolutely smooth surface, being careful to avoid cutting the color at the edges.

Secure the proper shade of bronze powder and special bronzing liquid from Gerstendorfer Bros., 229 E. 42nd St., New York. It will be best to practice the application of this bronze and liquid on a sample piece of wood, treated as for the shields. The bronze should be applied and then almost entirely wiped off from the sanded shellac surface with a fine cloth, such as an old silk shirt, so as to be free from lint.

When the proper effect has been secured, the panels should be allowed to dry 24 hours and then should be sprayed with a coat of lacquer. This must be done with an air brush and if no good finishing shop has one available, the chances are that some metal plating company can do this work for you locally.

Buffed plate work must be protected with a lacquer. Let the lacquer coat dry over night and smooth off if necessary with some very fine paper such as the worn out 6-0 split stock used on sanding the shellac coat. Panel may be dusted off and lettered and the whole thing given a final protecting coat of sprayed lacquer. Do not attempt to brush this material, or it will lift off the letters, bronze, and shellac coat.—Ralph G. Waring.





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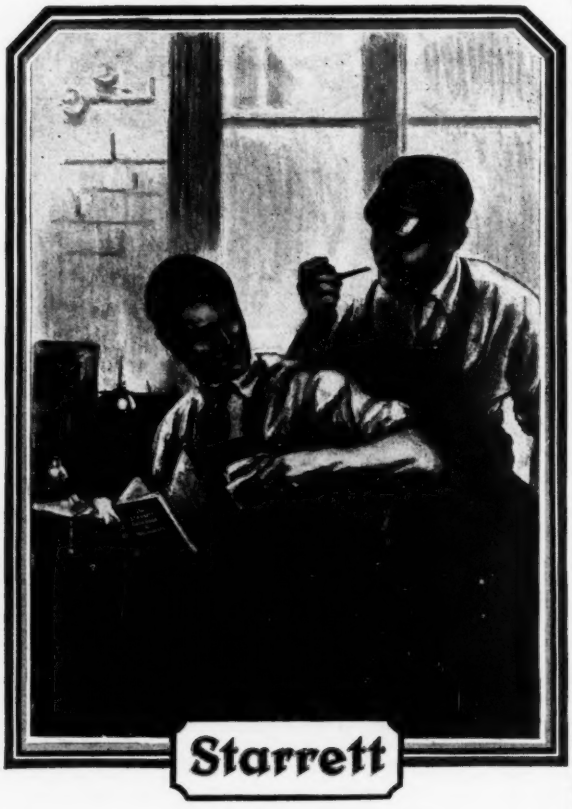

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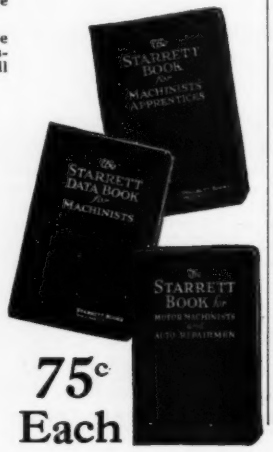

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A SURVEY OF BUILDING AND TRADES APPRENTICES

A survey has been completed of building and trades apprentices in Cleveland. Mr. John E. Fintz, coordinator of the department of vocational education of the schools, was instrumental in bringing to light some interesting conditions relative to past schooling interests and vocational choice of seven hundred apprentices enrolled under the trade extension plan promoted by the cooperation of the local board of education, employers' and employees' organizations, and state and federal boards for vocational education.

The trades represented and covered by the survey are machinists, plumbers, carpenters, bricklayers, painters, and electricians. The apprentices are workers in the trades and return to school for instruction a half-day each week, for which time they are paid by their employers.

A survey of attendance in the public schools reveals that the greatest mortality is in the eighth grade. It is found that 370, or 51 per cent, of the pupils never enter the ninth grade, and that 470, or 70 per cent, never enter the senior high school, while only 42, or six per cent, are ever graduated from the high school.

As a result of the study, it appears that some radical change in the school program must come about the period represented by the eighth grade. Permitting boys to specialize the last two years of the regular high-school course, when the majority of those to be served have gone from the school, will hardly assist in solving the problem. Of the 65 machinists enrolled in the schools, 21 were regularly enrolled in technical senior high schools. Only one remained for graduation, and twelve of the group dropped out at the end of the tenth grade or at the time when they were permitted to specialize in a shop subject, spending half the school day in the shop.

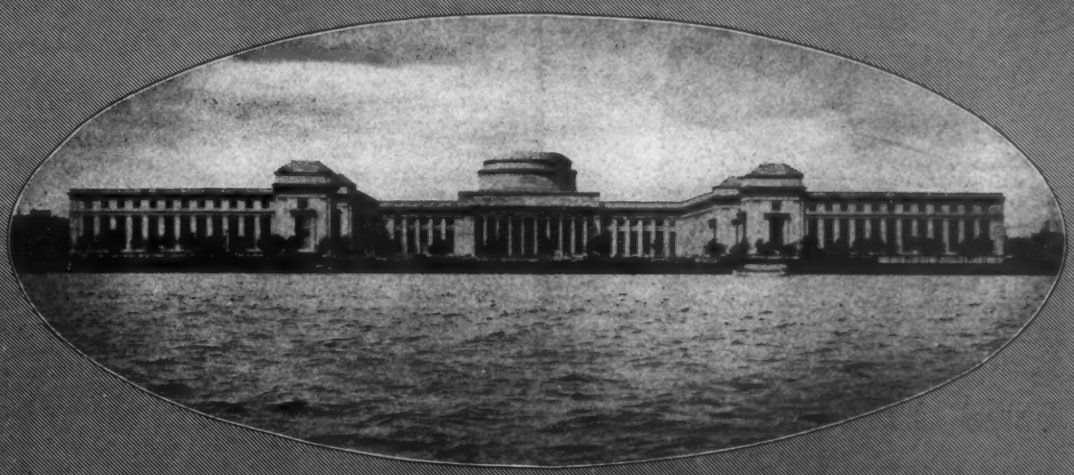
"It is brought out that to try to solve all the problems of vocational education through one form of organization will very likely result in the same condition as the effort of the high schools only a few years back to prepare all students for the liberal arts college. There is a need for all the high school courses to meet the needs of the day, and probably more. No doubt, the same thing is true in vocational education.

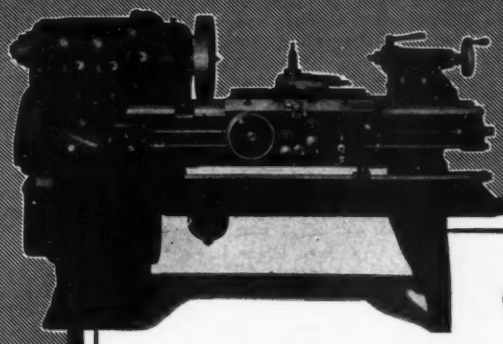
"It is believed there is an underlying principle back of the premature exodus from the schools which must be recognized. In listing their favorite subject while in school, the apprentices selected largely the subjects of mathematics, history, drawing and art, with other subjects in decreasing numbers. It is a matter of wonder why the manual arts did not receive a higher vote. Is dissatisfaction with the organized school to be found in the expression of how they happened to choose their trade? It is possible that the boys insisted on work in keeping with trade practice and that manual arts and shop work received no higher vote.

"Many boys do not know what is the best training in their particular case. When more than one in every four decide the school work is not to their liking, it causes one to stop and reflect. It appears that the pupils in the schools are interested in training but in a different type than that which educators have provided, and have urged them to accept. If pupils are willing to pay their own money for courses while the schools offer free training, the condition merits attention.

"Another condition which should be of interest to those in the field of vocational guidance is that twelve and one-half per cent, or only one out of eight, really quit school to learn a trade. This means that the other seven drifted into the work in which they are now engaged. Is guidance as valuable here as guidance in a college career? Will we give it the assistance of our schools or close our eyes to the momentous problem?"

Examples of School Printing Wanted—Mr. C. F. Lampe, manager of the Educational Department of Barnhardt Bros. & Spindler, Chicago, is seeking examples of good school printing for transmittal to European schools of printing. During the past six months, Mr. Lampe has gathered an inclusive exhibit of English, German, and French school work in printing and is arranging to show it at various conventions, where teachers of printing will be in attendance and will have an opportunity of examining it. The heads of European schools have asked for American examples and Mr. Lampe is prepared to forward anything which may be sent to him. It is believed that the exchange will create additional interest in high standards of education, for the printing trade and will be mutually helpful.





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The prestige of this Institute—the corner-stone of Massachusetts' enviable system of vocational education — attracts students from the four corners of the civilized world.

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We are proud of the selection of the MONARCH Engine Lathe as a part of the Institution's metal working equipment — proud that it has been selected solely upon its merit, after careful consideration, as the type of equipment necessary for the high degree of training which Massachusetts "Tech" gives to its students—a training which has been so creditably reflected on the Institution by its graduates.

We shall be glad to plan your vocational metal working shop. Give us a statement of your requirements and let our Free Engineering Advisory Service plan your shop, giving you an accurate estimate of the entire equipment cost. This service is gladly rendered without charge.

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NEW BOOKS

Glossary of English Furniture

By J. Penderel-Brodhurst and E. J. Layton. Cloth, 196 pages. Price, $2, net. Robert M. McBride & Co., New York City, N. Y.

Any study of furniture design and construction inevitably touches upon the history of furniture, and for us Americans, upon the history of English furniture. Such study involves the necessary use of historic, technical terms, and allusions to historic persons, events, and customs, that are not to be found in the ordinary books of reference.

The present book is intended to fill the need of the student of furniture for a glossary of furniture terms, and it does so quite acceptably. It is the work of two English authorities who cover the English school exhaustively and include many French terms used in connection with English work.

The several definitions, descriptions, and historic narratives are presented briefly and in many cases with interesting informality—not that the book lacks exactness. The style is rather that of an individual who is telling in a conversational way well known facts that are of interest to his hearers and to himself.

The list of words defined is inclusive, but, for use in the American schools, the absence of some terms and the lack of some technical information, perhaps, will be felt. Thus, the American teacher would appreciate the botanical names for such woods as rosewood, satin wood, etc., as well as the names of the common woods. He would welcome some phonetic clue to the pronunciation of French words and names and of unusual old English words. Then, too, he would appreciate reference to American colonial developments of such pieces as Windsor chairs, pine chests, and hall clocks, and mention of Duncan Pfyffe.

It is the completeness of the book that makes these minor shortcomings noticeable. For the school shop library the work will fill a much appreciated use.

Shop Teachers' Standard Class Record

By Walter R. Cannon. Cloth, two year, 75 cents; paper, one year, 45 cents. The Bruce Publishing Co., Milwaukee, Wis.

This book is compact, extremely quick for reference and affords space for all the records which a teacher need make of his pupils and their work. Under one main entry the book provides space for the name, bench or desk number, record of projects, cost and grade of projects, daily attendance, monthly grades, semester and final grades. The book is adapted to woodworking, sheetmetal, printing, machine shop, sewing—all the ordinary shop subjects. It is substantially put up and fills a real need.

Applied Print Shop Mathematics

By C. W. Hague. Paper, 32 pages. Price, 28 cents. The Bruce Publishing Co., Milwaukee, Wis.

This book is a concise text for acquainting the printers' apprentice with typical mathematical problems of the trade. The content follows the classification of the work of the trade, explains short cuts and quick methods, and provides many problems taken from actual shop work. Standard tabulations of type and paper are given for reference.

Mental Measurement in Educational and Vocational Guidance. By John M. Brewer. A condensed statement of the problem, the means available, the procedure, and the results achieved with bibliographies. Issued by the Harvard University, Cambridge, Mass. This pamphlet was prepared by a group of ten associates in the Graduate School of Education of Harvard University, working under the direction of John M. Brewer, director of the bureau of vocational guidance. It covers such topics as classifying and promoting pupils, choice of curriculum, discovery of ability, measuring occupational information, tests and ratings, readjustment and promotion. There is a very complete biliography and several lists of references are appended to the various chapters.

Teacher-Training Courses at Stout Institute. Cabinet-making, printing, electricity, pattern-making, bricklaying and automobile mechanics. A series of trade and industrial pamphlets prepared by E. E. Gunn, A. R. Graham, and H. M. Hansen, under the direction of George P. Hambrecht, state director, Madison, Wis. The courses offer standards for administration, courses of study, shop lay outs, equipment, and methods of instruction for the benefit of teachers and supervisors. The entire work was outlined through conferences with shop teachers and

(Concluded on Page 29a)

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Eleventh Annual Catalog, just from press, is free for the asking.

Thurston Manual Training Supply Co.

Jobbers and Manufacturers

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(Concluded from Page 26a)

committees, in cooperation with the shop instructors of the Stout Institute, and includes typical job sheets and suggestive jobs for each course.

Elimination of Waste. Simplified Practice: What It Is, and What It Offers. A summary of activities of the Division of Simplified Practice and the services offered to American industries. Price, 10 cents. Issued by the Superintendent of Documents, Government Printing Office, Washington, D. C. The pamphlet outlines the seven steps of the U. S. Department of Commerce for waste elimination through simplified practice, and offers a summary of examples in the application of simplified practice. There is a rather complete biliography of simplification in methods for business and industry.

Farm Economics

Frank App. Cloth, 8 vo., 700 pages. J. B. Lippincott Co., Philadelphia, Pa.

This text is not a text on the theory of economics with special application to farming but rather a textbook on agriculture from the standpoint of economical management and distribution. The author has brought together a vast amount of useful information based upon the latest statistics and the most successful methods of farm management. His grasp on such fundamental problems as agricultural credits, farm capital, crops, labor, farm layouts, rental, power and equipment, cooperation, etc., is masterly, his discussions sane, and his recommendations practical. The treatment is simple and the frequent use of graphical material makes it especially teachable. On the social problems involved the author is not so sure and his recommendations are hazy, and in the case of the rural church, wholly wrong.

Form in Civilization

By W. R. Lethaby. Boards, 12mo, 242 pages. Oxford University Press, New York.

Architecture, our modern cities, the products of industry, our houses and their furnishings are the modern forms of civilization here discussed—and sometimes cussed—by an English observer. The author has a pungent, epigrammatic style, a keen insight into the shams and failures of modern art and architecture, and a strong sympathy for the dignity of labor and the lasting worth of good craftsmanship. While some of his views are patently warped by the stress of the war years, he is not so radical in his views but that he finds much of worth in modern architecture—even in that of German origin—in recent craftsmanship and in labor. His views on the education of the architect and craftsman are worth considering, but his notions on education in general are narrow, tinged with Wellssian impracticability and neglectful of cultural, spiritual and civic elements.

Engineering as a Lifework. By J. V. Linn, Ames, Ia. Issued by the Engineering Extension Division of the Iowa State College, Ames, Ia. The bulletin has been prepared in the interests of young men of the state who are about to complete their high school studies, and who are looking out upon life with some concern because of the problem of selecting a vocation. It is intended for all teachers in high schools who act as vocational counsellors, whether they are assigned as counsellors or are merely assuming qualifications and the compensation. A list of sources of information is also provided as an aid to the student who the work in the interest of students. The pamphlet discusses various branches of the profession.

A Correction. In a recent issue of the INDUSTRIAL ARTS MAGAZINE appeared a brief item concerning Timbée's "Elements of Electricity" published by John Wiley & Sons. The price of the book is $3.50 per copy instead of $2.75 as mentioned in the review.

Mr. L. D. Laughlin has been appointed as instructor in wood-working and drawing in the junior high school at Charleston, W. Va.

Mr. A. L. Losey will teach at Redford, Mich., during the school year.

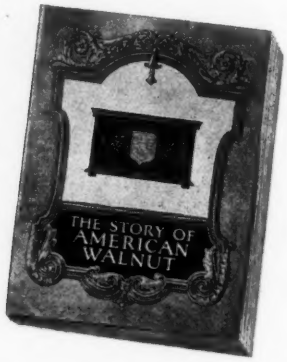
Mr. H. J. Maxwell, who taught last year in the Racine, Wis., vocational school, has returned to his position this year.

Mr. F. W. Voss, of Watertown, Wis., has returned to his position for the present school year.

Mr. R. S. Vaughan has been appointed principal of the Trapp Technical School at New Westminster, B. C., Canada, in place of Mr. Lawrence Lambert, resigned.

"The Story of American Walnut"

Is recognized as the authoritative work on this favorite cabinet wood. Five big editions have been distributed—ask for it.



"THE Story of American Walnut" was written to present the claims of this finest of cabinet woods to public preference.

Its success has been a tribute to the popular appreciation of walnut and to the interest in this lovely wood. It is on file in nearly all public libraries, in many universities and colleges, in the files of practically all the best architects, and in schools where manual training and domestic arts are taught. It has had tremendous circulation among furniture manufacturers and dealers, interior decorators and woodworkers. The book is now in its Fifth Edition, with another issue impending.

From its frontispiece where a picture of a beautiful old walnut tree lends new inspiration to Joyce Kilmer's lovely poem, "Trees," to the last page, it contains a wealth of authentic information on the subject of walnut.

In the chapter, "Down the Centuries with Master Woodworkers," it traces the use of walnut in furniture-making from the Renaissance to the present day. The text is illustrated with photographs of fine pieces of walnut furniture in the different ages of the transition in furniture designing. First the Italian Renaissance when the great masters of that period found new inspiration in creating pieces of such exquisite beauty that they are today the most prized possessions of great museums.

Then came the golden age of English designing beginning with the William and Mary period which was known as "The Age of Walnut," through the Queen Anne period and those famous masters Chippendale, Heppelwhite, the Brothers Adam, Sheraton, etc., who have left indelible imprints on furniture styles for all ages.

Our own early colonial interest in walnut is described and fascinating side lights thrown on the days when our best period in furniture making was developed. Then came the great recognition granted walnut during the world war when its lightness, stability and strength were tested in the making of propellers for airplanes and gun stocks. Later its adoption for automobile steering wheels.

The advantages and superiorities of walnut are then carefully analyzed and its marked qualities proved. Beautiful examples of modern walnut furniture are given, showing its great adaptability. Its use for interior trim and "walls of wood" is shown. An interesting chapter is the history of how walnut is collected and manufactured. This is valuable because it describes the methods of securing walnut logs and how they are graded and cut into commercial walnut lumber.

To many people the most worth while chapter is devoted to methods of identifying real walnut. The popularity of this wood has caused many imitations. With this book it is possible to recognize the genuine from the spurious and insure getting real walnut furniture.

There is a section devoted to the different cuts of walnut, how the glories of its infinite varieties of design and pattern are developed under the cutting tools of the expert. How walnut veneers are made and fine examples are shown of matched panels of stump, crotch and burl, so lovely that they are pictures in themselves.

There is another good chapter on the finishing and care of walnut which offers best methods of preserving its beauties.

This book is distributed free. If you haven't a copy we shall be glad to mail you one free and post paid to your address no matter where you live.

"THIS IS THE WALNUT AGE"

AMERICAN WALNUT

AMERICAN WALNUT MANUFACTURERS' ASSOCIATION
Room 1235, 616 South Michigan Avenue, Chicago, Illinois

Vocational Training Nets Students Large Bonus. Profits amounting to more than $97,890 have resulted from 1,019 projects worked out by students in Oklahoma of vocational agriculture in the year 1923-1924, according to C. W. Briles, director of the vocational education department.

The work of the vocational department is divided into three divisions, agricultural, home economics and trade-industrial. Courses in carpentry, cabinet making, masonry, oil refining, coal and metal mining are offered in the trade-industrial division. In the home economics division, courses are offered in child care, garment making, food selection and preparation, house planning, designing, decoration and millinery.

New Vocational School. A. G. McCreary, director of the vocational school at Beloit, Wis., has made a tour of schools of the state for ideas to be used in the construction of a vocational school.

Survey of Manual Arts and Vocational Education. Mr. James F. Barker, assistant superintendent of schools, Rochester, N. Y., has made a survey of the manual arts department of the Milwaukee elementary and high schools. He has also made a survey of the Milwaukee Boys' Technical High School.

Apprentices Go to School. The terms of the agreement under which the board of education of New York City is to cooperate with the unions and employers in conducting the central printing trades school provides all apprentice pressmen and journeymen will be required to pay a fee of $25 a year. Employers will also pay $25 for each of their apprentices attending. The funds so raised will not be administered by the board of education, but are to be used by the joint apprentice committee, upon which unions and employers are represented, in helping defray contributions to the support of the school.

Firms manufacturing printing presses and machinery have donated more than $100,000 worth of machinery to the school, all of it new and of the latest pattern. The unions will pay instructors the difference between union wages and teachers' pay. Employing printers are to pay $3,500 a year to the support of the school and the unions $5,000. Fees will be applied to raising this sum.

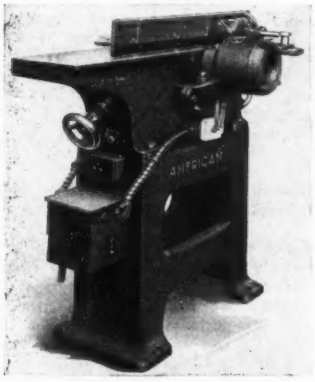
It is expected that there will be 240 apprentices attending the four years of the course which has been formulated by the employers, unions and officials of the department of education.

DECORATING THE BROADCASTING STUDIO OF THE LANE TECHNICAL HIGH SCHOOL, CHICAGO, ILL.

The Lane Technical School has opened a new broadcasting station, WLTS, the gift of the February and June graduating classes of the school. The station has a power of 100 watts, furnished by an 800-volt storage battery, the wave length being 258 meters. A good deal of the equipment, including the switchboard and aerials were made in the school shops, the rest being furnished by dealers at low prices. The total cost of the equipment was about $1,000.

The studio has been established in an old blue print room. The floor, walls and ceiling have been lined with Celotex, a sound-absorbing material which eliminates echoes and dispenses with the use of draperies. Students of the art department decorated the walls with a delightful frieze of their own design, the motif being sound in the different ways produced.

RADIO BROADCASTING STATION AT LANE TECH. H. S.



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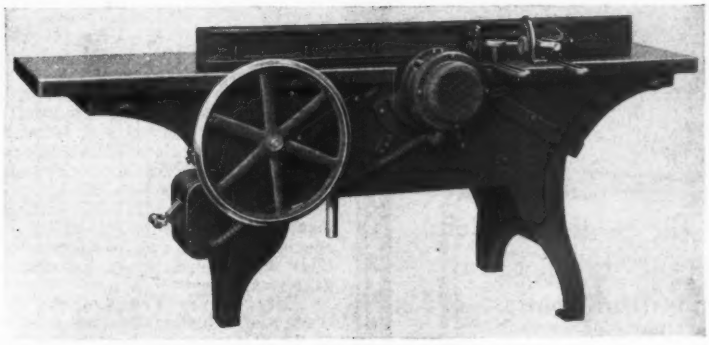
Knowledge Gained on American Machines will never Desert You

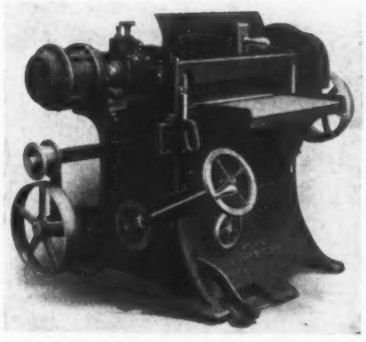
Training in Shop Practice should always be done on real shop machine.



American No. 1 Buzz Planer and Jointer

American Machines spring from the highest requirements of the industries. They are industrial machines.

"The tools of school are the tools of life"



American No. 1½ Single Surfacer

American Wood Working Machinery Co.

Educational Department

ROCHESTER, N. Y.

The Interplay of Color and Pattern

DECORATIVE pattern stimulates the imagination. There is always a challenge in area relationships, in color phantasy and in surface texture, to lead the student to further expression.

For decorative pattern, there is always one medium which always responds to color play, whether in brilliant contrasts or in subdued overtones.

That medium is PERMA Pressed Crayon.

PERMA outlines are clean; its tones are flat; its textures are pastel-like, without one speck to rub. Have you tested PERMA? We shall be pleased to send you samples.

Munsell PERMA is put up in assortments of seven, twelve and twenty-two colors. Regular assortments may be had in eight and nine colors.

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PERSONAL NEWS

Mr. Arthur C. Jewett, a recognized authority in industrial education, has been named as director of the College of Industries of Carnegie Institute of Technology, Pittsburgh, Pa., for the coming year. Mr. Jewett is a graduate of the Toledo University Manual Training School, and also of the Massachusetts Institute of Technology. After graduation from college, Mr. Jewett was employed as an engineering draftsman and later became an instructor at the University of Maine.

Returning to industry, Mr. Jewett joined Bird & Son, and later the Winchester Repeating Arms Company. In June of last year, he joined the research staff of the National Industrial Conference Board.

Mr. A. T. Holcomb of Windom, Texas, has become secretary of the chamber of commerce body at Clarendon, Texas.

Miss Pearl Lane has been employed as a part-time teacher of art in the schools of West Terre Haute, Ind.

Mr. H. G. McComb has resigned as state supervisor of industrial education of Indiana, to become associate professor of industrial education at Purdue University. Mr. Denman Kelley, of the Indiana Normal School, succeeds Mr. McComb as state supervisor.

Mr. Lynn A. Emerson, of Joliet, Ill., has recently been appointed as principal of the Boys' Vocational School, and also of the building trades school, Newark, N. J. Mr. Emerson is a graduate of the University of Minnesota and holds a degree as electrical engineer. He has taught electricity and auto mechanics and has had some varied experience in industrial fields. He was for three years state supervisor of vocational education in Maryland.

Mr. Ralph W. Kent has been appointed assistant director of the Essex County vocational school of New Jersey, a new position created by the Essex County vocational board to meet an expansion of the vocational school system. Mr. Kent is a graduate of Indiana University, where he specialized in electro-chemistry, and has completed the work for a master's degree at the University of Minnesota. He has had practical and teaching experience in varied fields. His teaching experience has been largely in high schools, where he taught a number of special subjects, and at Dunwoody Institute in the industrial science and power department. He will be located at Newark.

Mr. Harvey Freeland, for five years supervisor of trade and industrial education in Iowa, has been appointed to fill a similar position in Nebraska. Mr. Freeland succeeds Mr. L. A. Hartley, who resigned to accept a position with the National Founders' Association.

Mr. A. E. Gray, formerly at the South Park Avenue School, Warren, O., has become head of the wood-working section of the occupational therapy work conducted at the Austen Riggs Foundation, Inc., Stockbridge, Mass. The Foundation is a psychotherapeutical institution, located in the heart of the Berkshires.

Miss Christine Dorr of Appleton, Wis., has become head of the home economics department in the vocational school, Racine, Wis.

Miss Ruth Marie Jones has been appointed home economics teacher at Pender, Neb.

Mr. James McCutcheon of Mt. Vernon, Ia., has been employed as a teacher of printing in the manual arts department of the high school, Muscatine, Ia.

Mr. James R. Coxen, formerly of Wyoming, has been appointed director of vocational education in Hawaii. Under an amendment of the Smith-Hughes law, funds are now allotted for vocational work in Hawaii, Alaska, the Philippines and Porto Rico. The Hawaiian legislature has accepted the provisions of the law and has appropriated funds to carry on the work.

Prof. O. H. Day of Indiana has been appointed director of vocational education in the public schools of Kansas City, Mo.

C. L. Wetzel, electrical instructor, Lathrop Trade School, Kansas City, Mo., spent the summer at the University of Texas as teacher trainer in the industrial teacher training division.

William W. Samson of Fall River has been appointed head of the carpentry department of the Smith's Agricultural School at Florence, Mass.

Russell H. Erwine, formerly connected with the Springfield, Ohio, schools, has been appointed head of the vocational training department and attendance in the public schools of Akron, Ohio. Mr. Erwine will also hold the office of director of adult education and research. The appointment of Mr. Erwine was unanimously approved by the board at an annual salary of $4,500.

ELEMENTARY MILL WORK

Outlined by J. A. Shelly, Vocational Department, Public School No. 32, Jersey City, N. J.

Jointer Operating

General Instructions—The Jointer is only intended to straighten stock. If both edges are to be dressed, joint one edge and rip the other parallel to it, allowing $\frac{1}{16}$" for jointing the second edge. The second edge should be finished with one cut. If both faces are to be dressed, joint one face and run the stock through the planer. If a planer is not available the stock will have to be run through the saw to make it parallel. It should be ripped $\frac{1}{16}$" thicker than the finished size and finished with one cut. The jointer will not dress stock to a parallel thickness unless the sides are already parallel. Thin stock or stock less than 12" long should not be passed over the jointer. The guard should always be in place, covering the entire throat of the machine.

Adjusting the Jointer—The front table of the jointer should not be disturbed once it is adjusted. It should be tangent or on a level with the knives when the cutting edges are at the highest point. The back table is adjusted

Form No. V

TIME CARD

MONTH
YEAR

WOODWORKING SHOP, P.S. NO. 32 JERSEY CITY

NAME NO.

WEEK	CLASSIFICATION OF WORK													
	Building Construction	General Carpentry	Cabinet Work	Pattern Work	Mill Work	Repair Work	Turning	Finishing	Care of Tools	Fitting Hardware	Joinery-Jr.	Mechanical Drawing	Assembly	Absent
1														
2														
3														
4														
5														
Total														

Note: Record your time each day at the end of the session and return this card to its proper place in the card rack.

FORM FOR RECORDING TIME.

by means of the hand wheel at the back or side of the machine. This raises and lowers the table to regulate the thickness of the shaving. The back table is usually set $\frac{1}{32}$" below the front table. To edge stock the fence should be square with the table.

Operating the Jointer—Stand at the side of the back table and use both hands to control the stock. Put the greatest pressure on the stock with the left hand after it passes over the knives, using the right hand to guide the stock at the rear end. Do not walk along with the stock as it passes over the machine. Stand at the back of the cutters at all times, keeping the stock down on the front or delivery end of the machine. It is better to take two light cuts than one heavy one. If a smooth surface with a minimum of mill marks is desired the stock should be passed over the cutters slowly. The faster the speed of the cutters and the slower the feed the smoother the surface will be. The stock should be passed over the machine with the grain of the wood.

Main Processes on the Jointer

(1) Edging.
(2) Surfacing.
(3) Planing Parallel.
(4) Tapering (Table Legs, etc.)
(5) Tapering (Edge to Edge).
(6) Tetoning.
(7) Rabbeting.
(8) Beveling.
(9) Chamfering.
(10) Stop Chamfering.

BAND SAW OPERATING

Main Processes.	Essential Operations.
(1) Adjustments.	(a) Removing and Replacing Saws on Band Wheels.
	(b) Adjusting Tension.
	(c) Adjusting Upper Band Wheel for Position of Saw.
	(d) Adjusting Saw Guides and Back Supports.
	(e) Setting Saw Guide for Thickness.
	(f) Starting and Stopping.
	(g) Safety Devices.
	(h) Tilting Saw Table.
(2) Straight Sawing.	(a) With Ripping Fence.

The right forges benefit instructors and pupils—

Buffalo forges are standard equipment in the majority of vocational schools.

Instructors and pupils unite in expressing their appreciation of Buffalo Forges. The Buffalo "Down-Draft" hoods, with the indestructible underground duct system, keep the shop free of smoke and sparks; and there are no overhead obstructions to darken the room. Instructors say that pupils are anxious to work on Buffalo forges because of their compact design and substantial construction.

Pupils learn to handle the fire on a Buffalo forge quickly, and this helps them to turn out good work.

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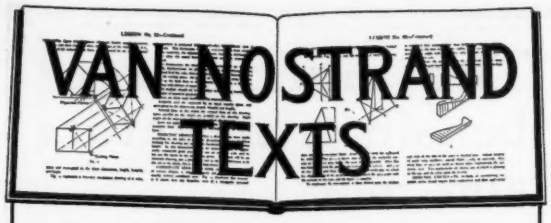
"Buffalo" Down Draft FORGES



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		(c) Re-sawing.
		(d) Multiple.
(3)	Curved Sawing.	(a) Inside.
		(b) Outside.
		(c) Compound.
		(d) Multiple.
(4)	Angle Sawing.	(a) Straight.
		(b) Curved.

FOOT POWER MORTISER.

Main Processes.		Essential Operations.
(1)	Adjustments.	(a) Placing Chisels in Spindle.
		(b) Adjusting Bed for Depth of Cut.
		(c) Adjusting Bed for Position of Cut.
		(d) Setting Stops.
(2)	Square Mortising.	(a) Through.
		(b) Stopped.
		(c) Slots.
		(d) Recesses for Locks, etc.
(3)	Angled Mortising.	(a) Through.
		(b) Stopped.

LATHE WORK

Main Process.		Essential Operation or Job.
(1)	Adjusting the Lathe.	(a) Removing and Replacing Spur and Tail Stock Center.
		(b) Adjusting and Locking Tail Stock.
		(c) Adjusting and Clamping Rest Socket and Rest.
		(d) Changing Speeds.
		(e) Removing and Replacing Face Plate and Chuck.
		(f) Starting and Stopping.
(2)	Centering.	(a) Square Stock.
		(b) Round Stock.
		(c) Irregular Section Stock.

Accident Record

No._____ P. S. NO. 24 25 32

Name_____ PLACE: Machine Shop

Date_____ 192__ ____ A. M. ____ P. M. Wood Shop

Machine or Tool_____ Print Shop

Kind of work_____

Nature of accident_____

How did accident occur?_____

How can the danger of such accidents be still further reduced?

Treatment given, and by whom? _____

When this accident occurred all the guards were properly in place and the instructor was in the room.

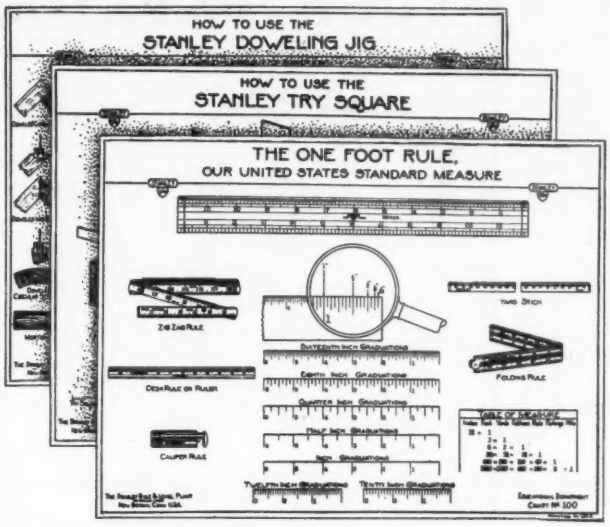
(Approved_____ Teacher) _____ 192__

_____
Chairman, Accident Prevention Committee

FORM FOR RECORDING ACCIDENTS.

(3)	Turning Between Centers	(a) Cylinders.
		(b) Shoulder.
		(c) Cones.
		(d) V Grooves.
		(e) Beads.
		(f) Hemispherical Ends.
		(g) File Handles.
		(h) Chisel Handles.
		(i) Mallet Handle and Head.
		(j) Balusters.
		(k) Newell Post.
		(l) Table Legs.
		(m) Lamp Column.
		(n) Finials.
		(o) Balls.
		(p) Long Thin Pieces.
(4)	Face Plate Turning.	(a) Fastening Stock to Face Plate.
		(b) Facing.
		(c) Turning Edges.
		(d) Rosettes.
		(e) Corner Blocks.
		(f) Lamp Base.
		(g) To Templet.
		(h) Inside of a Bowl.
		(i) Re-chucking.
		(j) Outside of a Bowl.
		(k) Cutting Off.
(5)	Drill Chuck.	(a) In Head Stock Spindle.
		(b) In Tail Stock Spindle.
(6)	Finishing.	(a) Sanding.
		(b) Varnishing.
		(c) Polishing.

Mr. Logan Fuller has been appointed superintendent of the Alabama School of Trades and Industries, to be opened shortly at East Gadsden. The school will offer a variety of trade work in carpentry, printing, cabinet making, and will in addition, give training in much related shop work.



Note:—There are two more in this series—Chart No. 102 on the Stanley Doweling Jig and Chart No. 101 on the Stanley Try Square.

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NEWS AND NOTES

Short Course Filmed. A short course for boys and girls at the state agricultural colleges is portrayed in a motion picture film of the Department of Agriculture, entitled "The Short Course." The course shown in the film was conducted by the state agricultural extension service, in cooperation with the United States Department of Agriculture, and shows such practical subjects as bee-keeping, botany, stock judging, buttermaking, and various sciences connected with the farm and household. The short course ends with a parade and the boys and girls depart to their homes to put their knowledge into practical use.

Reorganize New York Continuation Schools. Plans have recently been completed for a reorganization of the New York City continuation schools. Under the new plan, instruction in commercial branches, in the building trades, and in the printing trades will be centralized, each in a separate school.

Apprentices in the trades, under an agreement entered into by the school officials, employers and unions, are required to attend continuation schools on the employers' time, but must agree to attend night school apprentice classes as well. The Brooklyn continuation school is to be reorganized into separate schools for boys and girls, and a new continuation school will be established in Jamaica.

All young people not high school graduates, who are under 17 years of age, and who are out of school but at work are required to attend continuation schools.

The continuation schools will be in operation five afternoons a week from two o'clock until five. While the training in these classes is mainly along technical lines, the students will also receive academic training to fit them for higher positions.

New High School Print Shop. A fully equipped print shop, costing about $4,300, has been installed in the high school at Hutchinson, Kans. Mr. Frank Fee, of Wichita, has been placed in charge of the department.

Open Vocational School. Defiance, Ohio, has joined with other counties of northwestern Ohio in the employment of Alfred A. Neff, as instructor of the first department of vocational agricultural training in the county. Laboratory equipment has been installed in the Ney high school.

Itinerant Teaching Plan Successful. Success of the itinerant teaching plan begun the last year by the Wisconsin State Board of Vocational Education has been so great in the two sections where it was tried that more teachers will be added this year, according to George P. Hambrecht, secretary of the state board. The new system appears to be the best means of meeting the problem of the part-time trade apprentice who is required to attend school a certain portion of his time.

The Fox River Valley, which has had two traveling teachers, will have a third man. F. A. Mater, an experienced plumber and teacher, visited Appleton, Green Bay, Fond du Lac, Oshkosh and Sheboygan last year. This fall Appleton, Neenah, Menasha and Kaukauna will employ a man in the paper-making industry, and cities of the valley will also employ a teacher in the painting and decorating field. Southeastern Wisconsin cities, including Racine, Kenosha, Janesville, Fond du Lac, and Madison will have the first instructor for this work.

Students Complete Drawing Tables. Vocational students of the Harding High School at Marion, Ohio, have completed a set of 24 drawing tables for use in the mechanical drawing classes. The tables have wooden tops, planed smooth, and are provided with seats which swing underneath when not in use.

Disston Safety Campaign. Saw making is a somewhat hazardous occupation when left to its own devices, but Henry Disston and Sons, Philadelphia, Pa., have proved that it can be made much safer than many processes which appear to be less perilous. An annual safety meeting, celebrating the results of the 1924 safety campaign, was held at the Disston plant, with the officials of the company in attendance. At this meeting some interesting figures were presented by A. N. Blum, chief engineer, and chairmen of the special committee which organized the safety work nine years ago. He showed that in 1916, with a small working force, a total of 5,471 working days were lost as the result of 300 men being injured. In comparison, during the year just concluded, only 71 men suffered from injuries causing the loss of one or more days' time, and only 1,174 working days

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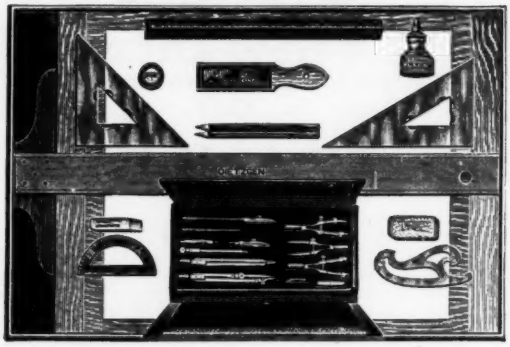

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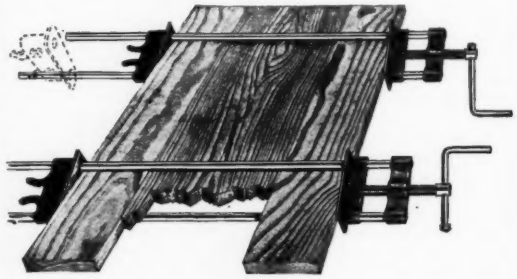

HARTFORD No. 6 Double Bar Clamps are also used extensively as presses—for veneering, gluing posts, chair arms, etc. The cost, however, is much less and the saving worth your consideration. Your first order will be followed by others.

Send for Catalog No. 10, which contains complete price list on single and double bar clamps.

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were lost through accidents, with the average days lost per accident reduced to less than seventeen. Safety first methods, resulting in prompt treatment of all injuries, however slight, contributed their share of these greatly improved results.

In addition to the safety work, an attractive insurance schedule has been worked out for employees of the business. Participation on the part of employees is voluntary, but the payment of the premiums by the company makes complete protection for the individual available at extremely low and favorable rates.

Boys Make Furniture. Boys of the industrial arts department at Cincinnati, O., under the supervision of the teachers, manufactured a large amount of necessary furniture at the Withrow high school during the summer. Great numbers of tables and benches were produced at a large saving as compared with manufacturers' prices.

Offer Industrial Courses. Industrial courses, including carpentry, electric wiring, and automobile mechanics are being offered this year at the Washington, Franklin and Lincoln junior high schools, Paducah, Ky.

A New Printing Paper. The Mergenthaler School of Printing of Baltimore has just begun the publication of a school paper, under the title of "The Printing School Journal." The first issue devotes some space to a sketch of the life of Ottmar Mergenthaler, the inventor of the linotype, who spent the most productive years of his life in Baltimore. The new paper has a page size of 10" by 12½" and contains eight pages. The typography and illustrations are most interesting, and the press work is perfectly done.

Mr. Charles M. Patter, of Boston, Mass., has been employed as an instructor of wood-working in the high school, Beverly, Mass. **Mr. Leslie J. Nutting,** of Wollaston, will be the instructor in printing.

Miss Florence Quast, of Mt. Vernon, Wash., will teach domestic science in the teachers' college at San Jose, Calif.

Mr. G. C. Mann, formerly state director of vocational education in Arizona, has been appointed director of vocational education at Berkeley, Calif.

Mr. O. V. Winks has taken up his duties as director of vocational work at Waterloo, Ind.

BUYERS' NEWS NOTES

New Catalog of Clark Electrically Driven Tools.—Teachers of shop subjects will be interested in the new complete catalog of Clark electrically driven tools, for drilling, grinding, and buffing purposes. The new catalog contains complete specifications and descriptions, as well as illustrations of a wide variety of Clark hand drills, bench buffers and grinders, and floor-type grinding machines, hack saws, bench drills, small industrial motors, and sensitive drills. Instructors will appreciate the complete directions for the use of grinding wheels. A copy of the catalog will be sent to any school authority on request, addressed to the James Clark, Jr., Electric Co., Louisville, Ky.

In connection with the catalog, the Clark Company has issued a special bulletin calling attention to the improved switch-control mechanism, which is an integral part of all Clark automatic drills.

This device is not enclosed in the handle of the tool where it would be cramped for space and inefficient, but is placed at the side of the motor, where it will be most convenient and efficient. The switch control is so arranged that when the operator grasps the handle and starts to perform work, he grips the handle securely. This gripping of the handle does not close the switch nor does the relaxing of the handle open the switch. It does operate a mechanism, however, that controls the switch blades so that when a certain point is reached, the switch closes and opens itself quickly and automatically. If this were not done, a great deal of arcing would result, due to slowness with which the switch blades work back and forth between the switch jaw, and the switch would burn up promptly.

There are several exceptional features to this switch control mechanism.

1. It is simplicity itself.
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4. The motor is stopped the moment the operator relaxes his grasp of the handle, thus relieving the current flow, and consequently keeping the motor from overheating.
5. If operator desires drill to run continuously, a locking attachment in the front of the switch box keeps the switch on.

With this automatic switch, the motor can be stopped without relying on any other operation of the hand or finger, consequently the wear and tear on all parts, including bearing, shafts, etc., is reduced to a minimum.

Offer New Saw Filing Practice Strips at Cost.—E. C. Atkins and Company, saw manufacturers of Indianapolis, Indiana, have recently begun the manufacture of saw filing practice strips, with fine teeth on one edge and coarse teeth on the other, in lengths of ten inches, and

ATKINS FILING PRACTICE STRIP.

are selling these strips at the nominal price of ten cents each. The strips are sold in lots of 25 to schools who desire to have their students receive lessons in saw filing.

In the past many schools found it impossible to give each student an opportunity to file a real hand saw, but through this filing strip, schools can purchase these strips for almost nothing, so that saw filing can be practiced on real saw teeth without going to the expense of supplying hand, rip, and panel saws for the purpose.

E. C. Atkins and Company will furnish these on regular orders from school boards in quantities of 25 strips and up and they will gladly send quantities of "Saw Sense" books on filing with orders for the strips.

Miss Emma March has been appointed as assistant supervisor of art of the Chicago public schools, at a salary of $4,000 per annum.

Mr. I. F. Kraemer of Muscatine, Ia., has accepted a position as manual training instructor in the high school, Lansing, Mich.

Mr. A. F. Crist of Shawano, Wis., has been appointed director of manual training at New London.

Mr. Harold B. Adams, supervisor of industrial education for South Carolina, has been elected principal of the Murray Vocational School at Charleston.

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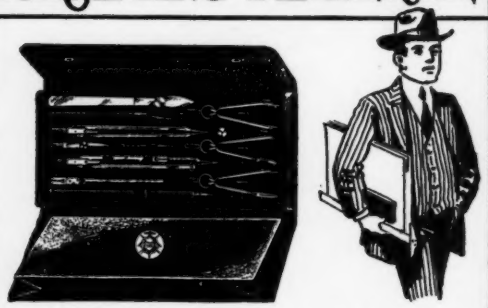

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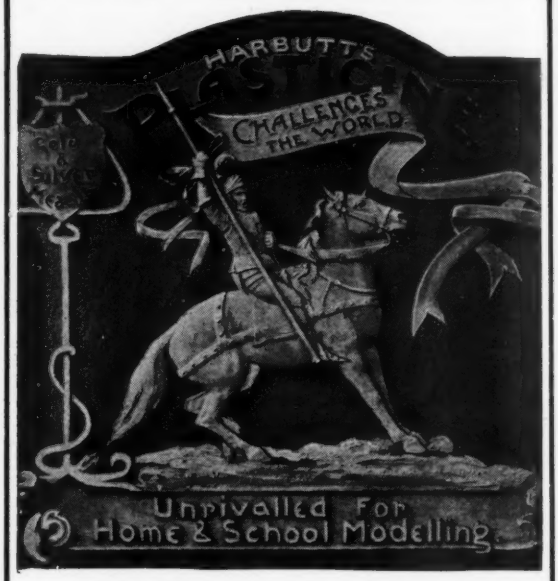

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